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Report
of a Research Workshop
on
**HUMAN BEHAVIOUR IN
DISASTER IN AUSTRALIA**

25 – 27 April, 1984

Prepared and published by the
Australian Counter Disaster College
Mount Macedon
1985



THE COLLEGE CHARTER

"The role of the Australian Counter Disaster College is to contribute to the development of an efficient Australian counter-disaster capability by training selected personnel in counter-disaster and civil defence requirements; by fostering understanding and co-operation between appropriate elements of the community and by undertaking research into selected aspects of disaster."



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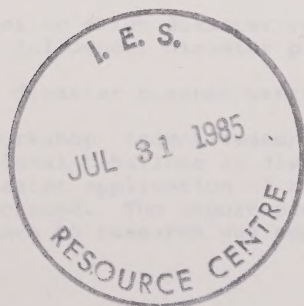
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**Natural Disasters Organisation
Department of Defence**

**Report of Proceedings
of a Research Workshop
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HUMAN BEHAVIOUR IN
DISASTER IN AUSTRALIA**

25 - 27 April, 1984



FOREWORD

There is little doubt that the paucity of post-disaster research into human behaviour in disaster in Australia was highlighted by the disaster events of 1983; or that, since then, the level of disaster research has been feverish in comparison. It could also be argued, quite fairly, that it took a disaster of the magnitude of Ash Wednesday bushfires to prompt the staging of this workshop, which was held at the Australian Counter Disaster College, at Mount Macedon, Victoria, on 26 and 27 April 1984.

The Workshop was funded by the Australia Department of Defence but, as a high level of specialised professional knowledge, understanding and interest in human behaviour in disaster were required to develop it effectively, some members of the Psychology Department of La Trobe University were approached, and accepted the invitation to assist in the preparation and conduct of the Workshop.

Although the stated aim of the Workshop was to exchange research findings on human behaviour in disaster in Australia and to discuss :

- * research questions which need to be addressed subsequently;
- * methodology to be employed following disaster;
- * application of research to the planning and provision of welfare, health and other services in and after disaster;
- * possible future directions of research; and
- * support required for research;

the program was designed to give a wider perspective and, in particular, to consider :

- * the extent to which disaster research influences, or might influence, disaster planning and
- * what the disaster planner wants from researchers.

During the Workshop, recent research findings on human and organisational behaviour in disaster were presented and the need for greater application of research findings to planning was discussed. The importance of an interdisciplinary approach to research was emphasised and the

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diversity of the interests and disaster-related experience of Workshop participants suggests that inter-disciplinary collaboration in this country could be broadly based. This is of particular benefit for disaster planners, who need to be able to draw simultaneously on resources and expertise from a number of different areas.

The achievements of the Workshop are:

- * it brought together a group of new-to-the-area and experienced disaster researchers;
- * it stimulated discussion of methodology and focused attention on the ethics of disaster research;
- * it undoubtedly prompted the documentation of some research which might otherwise have gone unreported;
- * it has stimulated some collaborative research since planning for the Workshop began.
- * and the Workshop provided an opportunity for a "scientific debriefing" for those immersed in recent bushfire work.

The Workshop also brought researchers into contact with some of the planners and providers of welfare, health and other disaster services. The hope that there might be progress in the wider aims of the Workshop, related to the application of research findings in planning and the formulation of planners' needs in terms of research questions, was frustrated by the unavoidable limitation of the Workshop to two days.

Although the Workshop papers published here provide evidence of considerable activity in the field of disaster research in Australia, an unfortunate lesson of our nation's history seems to be that funding for disaster research follows disasters, whereas it should precede them. Too little support appears to have been given to research into human behaviour in disaster or support to related inter-disciplinary research. With every disaster Australian communities will continue to re-learn, at a cost of human suffering, the lessons of previous disasters.

MOUNT MACEDON

December, 1984.

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WORKSHOP OPENING ADDRESS

by

THE DIRECTOR, AUSTRALIAN COUNTER DISASTER COLLEGE, MT. MACEDON

Although, in comparison with many parts of the world, Australia is not overly prone to disaster, we have experienced several devastating natural disasters. This was probably one reason why in February 1974, Cabinet decided that "the Charter of the existing Australian Civil Defence School at Mount Macedon, Victoria be expanded to provide research into, and training to deal with, natural disasters, and the School be appropriately renamed."

Following this Cabinet Decision the School was renamed the Australian Counter Disaster College: and, the College Charter now requires it to contribute to the development of an efficient Australian counter-disaster capability by training; by fostering understanding and co-operation; and by undertaking research. Then, on 5 April 1974, the Minister for Defence wrote to the Ministers in each of the States of the Commonwealth saying:

"My Government is conscious of the need for a scientific approach to the solution of many problems which are related to natural disasters..... and proposes, with your advice and co-operation, and in accordance with priorities assessed on a national basis, to sponsor competent institutions, or undertake with its own resources, a series of research projects which will bear directly on selected natural disasters,..... These projects will seek to identify improved means for predicting natural disasters, assessing their probable intensity, effects and passage and devising methods of avoiding them or minimising the harm they do. Apart from the scientific research mentioned above, the Natural Disasters Organisation will be concerned with operational research in the field; post-disaster reports and evaluations; seeking to improve counter-disaster planning and control techniques; developing a reliable record of natural disasters and their general effects, and other matters with operational applications....."

As a result of the Cabinet decision and following the Minister's letter to States, the Natural Disasters Organisation attempted to have a small research cell - comprising a Senior Research Scientist, an Experimental Officer and a Technical Assistant - provided at this College. In April 1980

an Experimental Officer from the Materials Research Laboratory was assigned for duty at the College to work under my direction: and he continues to work alone, with no indication that further manpower resources will be made available in the future to increase our research capability.

Before the Experimental Officer was appointed, I could find no one who was really aware of what Australian disaster research had been completed, was being undertaken or was contemplated. It was apparent that disaster-related research effort in Australia was certainly limited, and not co-ordinated in any way. Justifiably so, you may argue - but, the need for more disaster research and the need to establish more exactly what Australian disaster research has been done were obvious. Indeed, it was not possible to detect the voids which existed in the application of research effort in Australia until the extent of prior research effort was established.

The Experimental Officer has attempted to find out just what Australian disaster research has been completed or is being undertaken. He has compiled the Australian Disaster Research Directory, published in provisional form in 1983. I hope it will stimulate you to provide additional input for the "expanded" Directory, to be published in 1985. When the expanded Directory is produced, we should be well placed to detect research voids and then publish a priority list of research subjects which, in our national interest, need to be addressed.

Insofar as research into human behaviour in disaster is concerned, a Disaster Behaviour Seminar was held at this College in October 1976, to study aspects of disaster behaviour, with a view to formulating guidelines of practical application by counter-disaster authorities. In the report of Proceedings of that Seminar it is stated that:

"the authorities concerned in counter-disaster response must recognise that psycho-social requirements extend across the whole field of such response..... The practical application of existing knowledge supported by continuing research, will assist materially in a number of areas of counter-disaster response":

That report also recommended to the Minister for Defence that he circulate the report to his ministerial colleagues, the Minister for Health and the Minister for Social Security, requesting their Departments to give early attention to ensure that:

- a. research needs are given adequate priority. Two fields in which early research is required were suggested;
 - (1) the systematic description of the range of human behaviour and coping mechanisms in extreme adversity, and
 - (2) the effects on health of exposure to extreme stressor experiences.
- b. authorities concerned in counter-disaster planning and operations recognise psycho-social requirements in disaster situations and co-ordinate their activities in this field."

Although there is evidence of some progress and activity in the field of disaster research since that Seminar in 1976, I believe it is safe to say that too little attention has been given to research into human behaviour in disaster in Australia. There is no doubt that the paucity of post-disaster research in human behaviour in Australia was highlighted by the disaster events of 1983, or that, since then, the level of disaster behaviour research has been "feverish" in comparison. It could also be claimed, quite fairly, that it took a disaster of the magnitude of the Ash Wednesday bush fires to prompt us to stage this particular Workshop.

I hope this Workshop will provide the opportunity for those who have undertaken research into human behaviour in disasters in Australia, to exchange findings and opinions with a view to deciding guidelines which might facilitate follow-up studies and research into future disasters.

Although the stated aim of this Workshop is to exchange research findings on human behaviour in disaster in Australia and to discuss:

- a. research questions which need to be addressed;
- b. the methodology to be employed following disaster;
- c. the application of research planning and provision of welfare, health and other services in and after disaster;
- d. possible future directions of research, and
- e. the support required for research,

the program has been designed to give a wider perspective and, in particular to consider, in addition:

- a. the extent to which disaster research influences and might influence disaster planning, and
- b. what the disaster planner wants from the researchers.

With this in mind, I invited Dr Anthony Michaelis, who is the Editor of the highly-regarded British publication, Inter-Disciplinary Science Reviews, to deliver the Workshop Dinner Address on the subject of "Inter-Disciplinary Disaster Research": and, Mr Barry Grear, Chairman of the Bushfire Relief Advisory Committee and Executive Director of the Bushfire Relief Unit in South Australia following the 1983 Ash Wednesday fires - and now Deputy Director-General of Technical and Further Education in South Australia - to address the: "Applications of Research to Disaster Planning." I am grateful to these two gentlemen agreeing to undertake these important tasks, and to Professor Raphael for her major contribution.

The response which Dr Meredith Wallace, from the Department of Psychology at La Trobe University, received to her invitations to people to present papers is also very heartening. The range of topics covered in the papers which are to be presented augurs well for the future and could be taken to indicate a heightened interest here, in Australia, in the subject of human behaviour in disaster in Australia.

I thank all of you who are contributing papers for your support.

Finally, thank you all for attending: I trust you will enjoy the time you spend at the College and that you will leave here believing that you have engaged in a professionally rewarding event. With the wealth of understanding, knowledge and experience you bring with you, the stage appears to be set for a successful Workshop if you will engage in frank and free discussions of human behaviour in disaster in Australia.

AN OVERVIEW AND COMMENTARY ON THE WORKSHOP, HUMAN BEHAVIOUR IN DISASTER

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Introduction

Although people are a necessary element in disaster, it is surprising, as was indicated by Brigadier Gilmore, Director of the Australian Counter Disaster College, that there has been a neglect of unified and co-ordinated research into human behaviour in disaster. Whereas a significant body of knowledge and understanding of the agents of disaster and of the appropriate engineering or technological measures to mitigate their impact has been established, the explanation of the ways in which people interact with disaster stress is much more tentative. This situation arises from the complexity of the interaction rather than from a disinclination to analyse it.

The basis of counter-disaster activities, the training of personnel to assist disaster-affected communities, the improvement of the perception of the disaster threat, the encouragement of self-help in times of extreme environmental stress and the mitigation or elimination of the stresses, these and many other aspects of counter-disaster management require a clear understanding of the nature of human response.

The workshop, jointly sponsored by the Department of Defence (Natural Disasters Organisation) and the Department of Psychology of La Trobe University, represents a milestone in the study in Australia of human behaviour in disaster. While in aggregate there is a considerable amount of individual research on this topic, the workshop is the first occasion since 1976 in which it has been the specific focus of attention of a group of contributors.

In the final session of the workshop, discussions centred upon ways by which future research could concentrate on the most essential areas of enquiry. This, of course, necessitated the identification of the main gaps or inadequacies in the existing knowledge and a determination of the directions which future research could most valuably follow. Indicative of the current state of knowledge the resulting discussion revealed a range of divergent opinions on how the papers presented in the workshop could be welded into a form which could provide the foundation for research and a contribution to disaster management and the training of counterdisaster personnel. Time ran out before the discussion could be completed and it was proposed that an overview of the workshop should be attempted with these aims in mind.

This paper is an individual assessment by someone who might be described as a social scientist but who is not a professional psychologist, psychiatrist or sociologist. It seeks to examine the outcomes to the workshop that can usefully answer the questions, "How do we (practitioners and trainers) most effectively identify and deal with the behavioural problems caused by disaster?" "What issues arising in the workshop will aid the counter-disaster planner?" An element of translation is involved. As Clayer and Bookless-Pratz remarked, "A number of problems exist in transforming the research that has been conducted into the psychological impact of disasters into the practical provision of mental health services". The disaster manager or trainer has neither the time, nor always the background, to disentangle the matters under debate and to reach decisions on what should be incorporated into actual counter-disaster operations. The material presented here reflects the bias explicit in the above comments and may not always harmonise with some of the more specifically academic or scientific inclinations of the workshop participants.

Professor Beverley Raphael, examining the rationale for research into human response, identified three areas of interest: (i) counter disaster management, (ii) dealing with problems of disaster morbidity and (iii) the establishment of a stress/stimulus model based on the actual circumstances caused by disaster. The third of these can exist independently as a field of fundamental research or can be used to reach a better working understanding of the first two.

The Field of Concern

A number of definitions of disaster have been advanced. Several of the authors of papers touch on this important question (for example Britton, Chamberlain and Leivesley, and Michaelis).

Most, if not all, definitions are vague or ambiguous to a degree, involving unquantified or qualitative statements. The problem is exacerbated by the use of like terms such as catastrophe, emergency, accident or a general term such as environmental stress. Many of the authors interpreted disaster in different ways from each other. This divergence relates to the scale of event, scale of impact, frequency of occurrence, area affected, suddenness of onset, type of impact, (material disruption, death and injury, economic, psycho-social), characteristics of the impacted community (social systems, technological sophistication, resource base). There are considerable differences between urban and rural societies and economies, or between Third World and post-industrial countries. In addition to the distinction between natural and man-made disasters, there are many different individual types of disaster under each of these headings. The pattern of disaster onset varies from a gradual "creeping" type such as drought to events of great suddenness such as bushfire. Some disasters are predictable, and it is certain that they will occur at some time in the future. Others are possible but not certain. Not all disasters produce the same amount of stress (Cook, Wallace and McFarlane).

It is also relevant to note Professor Budd's abstract, "Disasters, like disease and trauma, result from the interaction of multiple causes. The causes are associated with three factors: the host (ie the victim), the agent (physical, biological or chemical) and the environment, which may intensify or diminish the impact of the agent upon a sensible host. Human behaviour profoundly influences all these factors".

It is clear that disaster implies a diversity of possible circumstances. Introducing the question of human response adds to the complexity of the problems.

Social scientists are sometimes criticised because of an apparent inability to provide simple, precise and unequivocal statements on how humans will perform in different situations. Humans display a complex range of mental and personality characteristics. These may well differ between individuals and groups. Human activities are set in a total environment which influences behaviour but also derives some of its qualities from man. Cultural, ethnic, demographic, religious and other aspects of society mediate in any adaptive situation, normal daily life or disaster.

It is difficult to unravel the many elements that make up human behaviour. It is even more challenging to establish general laws of behaviour, and it may well be more misleading than helpful. Such a situation may frustrate those who have to organise counterdisaster operations or have to train the personnel involved. It may be unavoidable however.

There are further complications. We are not looking at the response of one group in a given disaster. Within a disaster-affected community some have borne the full brunt of the event, while others in a peripheral location escape the full impact. In either of these situations not every individual suffers similarly.

A number of different categories of persons are at risk in a disaster-affected community. From the general public come the traditionally recognised victims who are served by the counter-disaster organisation. Those who work in that organisation (unless they come from outside the stricken area) are also members of the general public. They are made up of many sub-groups with different responsibilities, outlooks, training and types of disaster exposure. The decision-maker, the planner, the administrator and the bureaucrat have different roles, are involved at different times and are subject to different forms of stress. Practitioners are at the forefront of relief delivery and operate in a variety of ways as fire-fighters, police, emergency, medical and welfare services, mental health and other counsellors. They will be exposed to a wide spectrum of stressors. Clearly human response will relate to many different types of people. The complexity of our study is therefore even greater, yet as Grear pointed out the basic criterion for all areas of disaster planning is a need for simplicity.

Response to Disaster

Attempts to understand the problems and needs of disaster-affected communities have concentrated until recently upon the victims from the general public. It is now recognised that the stress and welfare of disaster workers in the field demands attention. As yet the impact of the abnormal conditions of disaster on those who are in some way involved with planning, directing or evaluating counter-disaster operations receives little recognition. Even researchers in the field are not free from stress.

Professor Singh raised the important issue of ethics in research. He examined the principles of the least harm to the respondent, the need for informed consent and confidentiality. Research should be objective. Its justification should be the improvement in the understanding of the matter under enquiry, but it should neither cause undue stress to the individual nor fail to maintain strict confidentiality. This should be the sole motivation but other motives creep in. There may be an additional desire to help the stricken community, to take advantage of what is a natural research laboratory, to find exhilaration from the experience or even to seek some form of personal advancement.

Those who are being investigated are already likely to be suffering some form of stress and do not welcome being asked to recall past trauma or undergo interviews or complex questionnaires. In this context the desirability and suitability of long questionnaires is debatable. Those exposed to these sorts of enquiry find it difficult in the stresses of the time not to group together the do-gooder, the voyeur, the researcher and the official inspector. Researchers can become part of the disaster impact and add to the stress. Commonly the counter-disaster officials and worker, with other matters on their minds, see the researcher as an impediment and a nuisance.

Research Problems

The preceding comments have sought to demonstrate the problems of data collection. There are additional methodological problems.

A disaster situation is highly dynamic. Ideally research should begin from the moment the disaster is identified (were it possible, of course, one would like to anticipate the disaster and start still earlier). Quickly, as time passes, evidence is lost, behavioural patterns cannot be observed directly and have to be reconstructed, ideas or beliefs change or are concealed. In the presented papers, where interviews or questionnaires were involved, the first enquiry in a sequence often took place weeks or months after the event. While in some cases this was dictated by the research design, in others valuable time seems to have been lost. Funding delays or unavailability of personnel because of other commitments can often prevent a rapid start.

It has been, and to a large extent still is, a feature of counter-disaster activity to concentrate on the few days following the emergency, and then to hand over the problems and the disaster affected community to the normal community services, such as welfare, counselling, psychiatric and health services. It has become increasingly apparent that those at risk in physical and, even more, in psychiatric terms suffer for months, perhaps years, after the event. Post-disaster stress disorders are not necessarily resolved by the passage of time (McFarlane and Croft). If they are untreated, long lasting mental or personality harm may occur. The volunteer mental health team that worked in Victoria (Macedon) after the bushfires were still displaying psychological effects 11 months after the fire (Berah et al). However it was observed that of the 2000 initial contacts with South Australian Community Welfare Services after the fires only 50 were on the books in midAugust. Clayer and Bookless-Pratz consider that a large proportion of psychiatric morbidity is resolved within a year of disaster. It is nevertheless clear that human behaviour must be considered in a longitudinal time sense, even though the percentage of the overall affected community experiencing more persistent effects is small. It is difficult to obtain funding or uncommitted personnel for this longer research.

In many of the papers presenting the outcome of specific studies a proviso is made that the results are tentative and preliminary, and that it is premature to make generalisations. The caution is understandable, but from the viewpoint of those wanting to apply up-dated knowledge the situation is frustrating. The samples in the questionnaire or interview surveys are small. Research on specific disasters rarely permits the establishment of a perfect, statistically random sample. Hence there are risks of unrepresentativeness or distortion. The scale of the investigation and the time available often make it difficult to undertake an appropriate control survey for comparison.

Evaluation techniques applicable to data on human behaviour are often difficult to apply. The very fact that data must be collected in the field introduces a new dimension into the situation. Apart from the fact that interviews may be harmful there is always the problem that respondents may seek to please with 'socially desirable responses' (Singh refers to 'attribution theory'). The respondents' own perceptions colour their response and situations may well be rationalised as time elapses after the disaster. Systematic forms of questionnaire analysis, such as various symptom scales, the General Health Questionnaire or Impact of Events Scale, assist the cross-comparison and standardisation of data. Professor Budd suggested that classical epidemiological methods, (medical ecology), have great merit. On the other hand these various approaches may be constraining, and for particular enquiries special diagnostic criteria may be better, though the findings may be difficult to equate with other studies and general conclusions are less easily reached. It is difficult to assess whether the results of individual case

studies, though providing valuable information, are unique to a given set of circumstances or can permit widely applicable general conclusions. Anecdotal and descriptive statements are much less readily assessed than quantitative data.

The question of the correct techniques of statistical analysis is important, but was not pursued as a major theme at the workshop. Some of the studies had used correlation coefficients, multiple regression and principal components analysis. Reliable hypothesis testing is another aspect that merits attention.

Disaster Myths

The general community, and indeed many counter-disaster personnel, hold popular beliefs, which researchers consider at variance with the truth (see Blong's reference to Quarantelli and Dynes, 1972) such as panic, looting, anti-social behaviour, inability to think or plan after disaster.

Only through careful objective surveys of different disaster impacts can correct judgments be reached. There is a danger when researching human behaviour, though this criticism is not directed at any of the workshop participants, that preconceived beliefs are perpetuated by enquiries which assume that conclusions that agree with earlier work are necessarily validated. Provided objectivity can be maintained, a growing weight of common findings increases the confidence in generalisations based upon them. However the possibility that all researchers started from the wrong premises cannot be automatically dismissed.

The Format of the Workshop

The opportunity to exchange the results of research undertaken on the 1983 Ash Wednesday bushfires was the initial stimulus for the workshop. Further planning broadened this aim to incorporate other, wider aspects of human behaviour in disaster.

Several broad issues provided the framework for grouping the presentations. An examination of fundamental issues in behavioural research related to disasters provided an introduction for the reports on the Ash Wednesday fires research which looked at their impact and the provision of welfare and other support services. Following these specific discussions some broader aspects of the organisational structure of the counter-disaster set-up and welfare delivery in Australia were examined. The section with papers on case studies of disasters provided comparative material from stress or disaster situations other than bushfires. Examining helpers and workers in disasters, particular emphasis was placed by several participants on the nature and significance of the effects of stress on this group. One paper in the section on broad issues in disaster response analysed more widely the underlying influences of major

disruptions upon human response. Others looked at broad aspects of the public awareness of disasters and at the organisational structure of Australian counter-disaster organisations. The address at the workshop dinner placed the subject into an international perspective, and in particular highlighted the importance of supporting in a positive way the inter-disciplinary character of disaster research. (Michaelis, 1984).

Review of Workshop Proceedings

This section attempts a general overview of the ideas and material presented in the workshop. It is not intended to cover comprehensively all the discussions but rather to seek to identify areas of widespread agreement, where divergent views prevailed, or where significant gaps in understanding still remained.

i. The impact of disaster

Allowing for some differences in the interpretation of disaster, a range of effects upon both the individual and the group, material, economic, psycho-social and medical, were identified. Some studies focused upon specific groups, but it was recognised that a rigid distinction between victim and helper, especially where the latter came from the affected community, was unrealistic. The significant point was that for all those directly or indirectly affected, disaster caused disruptions which differed from normal day-to-day experiences. The impact was very apparent amongst those who had specific and stressful duties in or after the emergency, such as fire-fighters, mental health teams and counsellors, insurance assessors etc. "A small but significant minority of disaster relief workers can suffer significant psychological morbidity as the result of their experience" (McFarlane and Croft). The view was also expressed that psychiatric disorders were a function of individual vulnerability rather than of the environment (McFarlane).

With varying emphasis there was considerable agreement about the nature of the reactions, amongst which were mentioned denial, apathy, complacency, undue confidence in relief workers, frustration, anger, helplessness, anxiety, depression, numbness, loss of self-respect, feelings of guilt, intrusive thoughts and recurrent memories of the event, fantasising, loss of confidence in ability to weather a future disaster, social upheaval, family tensions. How far, if any, a distinction exists between non-disaster and disaster stress, except that the scale and spread of effects of the latter are greater, was not determined. "Is it possible to establish a generic grouping of human responses applicable to all disasters or are response patterns a function of disaster type and community characteristics?" Assuming the latter alternative implies that training or support systems should be flexible and adjustable to each particular set of circumstances. Two general groups of respondents were distinguished: 1. those who were passive and felt that external factors controlled their fate, 2. those able to call on

internal resources to control their own lives and meet directly most environmental challenges. The former group tend to be more susceptible to stress. An important area for study is the identification of coping problems and the basis for improving coping capacities. It is a challenging task and, of course, extends beyond purely disaster response.

The belief was expressed that disaster-affected communities had a higher coping capacity than many people, including relief workers and the organisers of support systems, were inclined to accept (Kearney and Britton). The question of the predictability of the consequences of disaster, particular with respect to psychiatric disorder or physical health, was considered though the emphasis and conclusions varied. Either on a short- or long-term basis the vulnerability of victims or helpers showed individual variations. If a sufficiently reliable prediction of vulnerability were readily available prior to disaster, it would help to determine the selection criteria to be used in vetting trainees for counter-disaster or relief operations.

Predictability depends on the identification of the high risk groups. A range of potentially relevant factors has been canvassed including age, sex, ethnic group, genetic susceptibility, cultural background, family structure and work pattern. Higher risk groups included children between 8 and 12 years old, especially from unstable homes, older people, those with a prior history of medical or emotional illness. Some claimed that females were more susceptible than males. The underprivileged have also been identified by some as a high risk group, but it seemed that social class was not a valid indicator. A reliable guide to those most likely to need help would be invaluable, but at this stage their identity is rather elusive.

It was suggested that the Ash Wednesday events indicated that general medical practitioners and social workers showed a low level of detection of post-disaster stress disorders (McFarlane; Innes and Clarke). This led to the conclusion that there was need for a professional input and the establishment of planned psychiatric services within the counter-disaster organisations so as to permit early detection and treatment.

ii. Planning counter-disaster activities

An essential part of effective response is a pre-planned organisation able to operate smoothly and promptly, however infrequently or irregularly it may be called on. It was suggested that in Australia there were a number of limitations in the present structure of counter-disaster response at different levels. A conceptual framework made up of cardinal, controlled, conditional and constrained elements in the response network was presented and its weaknesses analysed (Britton). Up to now little attention has been devoted to the over-all evaluation of the existing organisation and the roles of personnel within it.

It is unfortunately the case that similar response problems recur in different disasters, which suggests that more attention is required in the pre-disaster stage to the philosophies of the organisation and appropriate patterns of action, so that the most effective structure for the mitigation of disasters and the provision of help can be established.

In a more specific context, it was claimed that little attention is being devoted in Australia "to the ongoing development of a policy for the social welfare services" (Chamberlain and Leivesley). McFarlane and Frost pursued a similar point, "A review of the literature field failed to find any systematic audit of disaster welfare services that allowed the drawing of objective conclusions". Assessments had to rely mainly on anecdotal accounts.

A number of aspects of human behaviour in the pre-emergency and post-disaster phases received attention. Some of the main questions are considered below.

a. The matters that concerned disaster-affected communities or individuals included loss of life and injury, loss of relatives, loss of property and possessions, fears of looting, evacuation and restrictions on early return to homes, financial needs. The community includes the relief workers and their identified areas of concern and need. The planning of relief organisations and training schedules requires reliable information on community priorities. These must be derived from a study of the communities themselves. It is dangerous to make blanket decisions about the needs of victims. There is still further research to be undertaken before an authoritative guide to the needs of disaster-impacted communities can be drawn up. An inventory is needed of stress situations. Identification of their effect, and agreement on ways to minimise or eliminate these effects and to strengthen the coping mechanisms of the individual and of the society are also required.

b. "What emphasis should be placed on community awareness?" Some researchers felt that the general public displays a poor capacity to learn from experience. A well informed community (or relief worker) should be able to deal better with the problems of disaster. It is important to know the nature of the potential hazards and their probable effects. The receptivity of advice from the police, emergency service personnel, relief workers or counsellors is facilitated if the situation is understood. Those who aim to help the community must be able to decide whether their advice should be given in an authoritative or persuasive manner. The question of self-help requires information and understanding.

c. The information base is important at all stages from planning for through to management of a disaster. It was indicated in the workshop that there was often a deficiency of information for the relief workers in the field or for the branches of the counter disaster organisation. Interim audits

with field workers during the post-disaster phase serve a double purpose. The workers themselves understand the position better and better documentation of the disaster is possible. It is also important that, so far as circumstances permit, careful records should be maintained by relief workers in the field. Data collection however usually takes a second place to the provision of relief. Valuable information can be derived from post-disaster impact surveys, especially if they are extended longitudinally over a sufficient time. More attention is needed to evaluate the operation and achievements of the counter-disaster services once the disaster is over. The media are a major source of information but the material collected reflects their judgment of what is of interest. There is also benefit to be gained from the information feedback from exercises (which should be held more frequently) designed to test the effectiveness of disaster plans.

d. Support to a disaster-impacted community can take a variety of forms - material or tangible help, social and emotional support, information. Its value and character will reflect the characteristics and needs of the involved community. A thorough appreciation of the nature of psychological reactions to disaster is a prerequisite to the delivery of relief. Different sorts of disaster stress will require different forms of help. It is necessary to examine the organisation of support and the means of providing it. The outcome of such studies must then be the basis for the education and training of those who have to provide the support. Support systems need constant re-evaluation since needs themselves change.

At a time when the daily routine is in a state of upheaval those in need of material help or counselling must be protected from too complex a relief system. The operation of the Bushfire Relief Team in South Australia (Gear) demonstrated an encouraging awareness of this. Relief agencies located at a variety of places, acting in isolation from each other, with limited periods of operation, can prove frustrating to those seeking assistance. If a single centre (or a limited number) at which all the required help is obtainable were set up this in itself would help to reduce stress.

e. The value of self-help was emphasized at the workshop which recognised the merits of the 'therapeutic community'. Conversely there is a danger that help imposed from outside, especially if from outside the disaster area, may be counter-productive. The view was expressed that only the disrupted community can re-establish itself (Kearney and Britton), while it was also stated that to be effective relief operations need the sanction of the community (Buckingham and Grigor). External help should be viewed as a resource to be drawn on by the community when required. These remarks imply that the community can make the necessary judgments, but Blong's findings suggested a poor level of understanding of behavioural response in disaster by the general public. Some victims welcome the support systems

provided from external sources, while others prefer to call for help from those they would normally resort to. The family is often a valuable support unit. The help required may be just an opportunity to talk about the disaster experience. This and other help may be derived best from within the community from those known to and respected by the victims. In the case of the fire-fighters suffering from stress, emotional support from their co-workers was often the most valuable (Innes and Clarke). These attitudes, and the possibility of emergent self-help groups, should be taken into account in planning disaster relief. However, in specialised areas, such as mental health, skilled professionals may need to go out early into the community and not wait for people to come to them (Berah et al). There still remains a debate concerning the relative merits of self-help and imposed help.

f. The importance of debriefing those involved in relief delivery was emphasized both for information and as an aid to minimising the psychological stress of the relief tasks. A significant point was made by Innes and Clarke, "The implications for 'debriefing' procedures after an emergency, or for the training of coping devices, are very different if we have to aim to change the social forces within a group, as against changing the behaviour patterns of the individuals within the group".

g. Interagency and interpersonal conflicts too often characterise disaster relief operations (for example the experiences of the Mental Health Team in the Macedon area, Berah et al). Careful pre-planning and job specification may help to remove some of the potential causes of friction. Job specification can also help to ensure more uniform procedures between one relief worker and another. In addition 'scapegoating', as an excuse for non-performance or incorrect action can be minimised if responsibilities are clearly understood in advance.

One such area of conflict in disaster operations results from the role of bureaucracy in disaster management which is criticised for being too cautious, passive or divorced from the urgency of disaster situations which often require quick decisions in the field. A happy medium between adequate control and unrestrained action is needed.

h. A number of other aspects of human behaviour in disaster were omitted from the workshop discussion, or received limited attention, or cannot be dealt with here because of space. Problems of registration and failure to register, evacuation and temporary accommodation, warning problems, the administration of relief funds and goods, the difficulties of those who have escaped the impact of the disaster in appreciating the difficulties of those which have suffered, appropriate work schedules for relief workers to permit essential rest periods are but some of these aspects. In several of these areas there is a need for considerably more research. Longer term political, economic or social implications of reconstruction were not examined.

iii. Research

Many of the workshop papers were either preliminary or provisional reports of field investigations, qualitative and generalised in their findings or narrow in their scope, so that it is difficult to derive general principles from them. In one of the areas to which the workshop gave considerable attention it was stated that, "Psychological investigations tend to be relatively datadriven rather than theory-driven" (Innes and Clark). Considerably more research is required before basic concepts can be formulated and validated. Some of this research, however, must still aim at adding to the body of comparative data. A data bank of appropriate questions for particular disaster surveys would be a valuable aid.

The greatest need is to co-ordinate the range of research being undertaken, and in the process, to reduce the repetition of research which it is difficult to avoid, unless it is known what has been done or is in hand.

The workshop participants recognised the value of the Australian Disaster Research Directory (1983) and strongly supported the need for its up-dating, in particular in the area of psycho-social research. A Newsletter was also proposed, to appear about three times a year, to improve the awareness of work in progress and to facilitate the collaborative work of disaster researchers over a wide range of disciplines. The importance of a focus and a continuity for future disaster-studies was recognised and support was advanced for an extension of the disaster research capacity of the Counter Disaster College.

Academics jealously guard their freedom to research in directions they choose. Kearney raised the question whether the emphasis should be on data collection and evaluation or on the development of fundamental concepts. A distinction was also made between controlled research based on accepted standardised methodologies and free ranging enquiries based on methodologies chosen for the particular task. In any case there is need to know where the main gaps in knowledge and understanding are. "Who is to provide the guidance on these fundamental research policy decisions?"

Apart from a more concerted follow-up from the aspects raised in this workshop, there are other ways in which progress could be achieved. A single research funding body would permit broad guidance to be given, through the funding policy, on the selection of appropriate research projects, as well as improving the support for research. A single body which could stimulate, advise on and assist disaster research, an idea mooted in the Canberra Symposium on Natural Hazards in Australia in 1976, could do much to coordinate the research needed. Many research investigations require an input from interdisciplinary or multi-disciplinary teams. Workshops at regular intervals on similar lines in order to up-date knowledge, report on research achievements, unify ideas and examine future research directions, would help to maintain the momentum of interest and activity. They

would assist the presentation of findings in a form that make them more assimilable in the improvement of counter-disaster plans and the training of personnel to implement them.

Conclusion

To achieve the aim of improving counter-disaster organisation, education and training, the result of research must be translated into a form that it can be applied to these activities. Gear provided a useful list of matters of practical relevance on which further research would be productive. Perhaps no more is needed than to emphasize this responsibility of researchers. Those who research on disasters and particularly on human behaviour in disaster generally hope to see the results of their studies being not only academic but also of practical value. Those whose research interests lie in the study of human behaviour in disasters should, in addition to maintaining their own special areas of concern, think about the over-all aspects of the subject and consider the gaps that still remain to be filled and the integration of the whole body of knowledge.

References

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| Australian Counter
Disaster College, 1984 | Australian Disaster Research Directory.
Provisional - 1983 |
| Michaelis, A R., 1984 | Editorial : Interdisciplinary Disaster
Research. |
| | Interdisciplinary Science Reviews,
9, No 3, 193 - 195. |

WORKSHOP CLOSING REMARKS

by

THE DIRECTOR, AUSTRALIAN COUNTER DISASTER COLLEGE

During the last two days we've covered a lot of ground. We've heard the results of research recently conducted into individual, community and organisation behaviour in disaster. Indeed, we've had so much information provided to us that I'm sure we all need much more time to mull it over in our minds before we can determine its potential value and application.

Even though this wealth of information has been presented, it behoves us all to remember that we have merely applied the under-coat on a vast canvas which portrays the disaster research field. Many other disciplines will be involved in research into the various aspects of disaster before the canvas is properly covered. Indeed, Dr Michaelis' dinner address focussed on the need for inter-disciplinary research, and called for the establishment of an international disaster research laboratory. I believe that this particular proposal warrants further close consideration, with a view to working towards the establishment of such a research facility. Perhaps, through the various avenues available to you, you might care to further discuss this matter.

But, have we achieved the stated aim of this workshop or even the broader aim which I mentioned in my opening remarks? Not entirely, I would suggest - but we have made considerable progress. We certainly have exchanged recent research findings on recent human and organisation behaviour in disaster and discussed the need for the application of research to the planning and provision of welfare, health and other services before, during and after disaster and we've looked at some possible future directions of, and the support required for, research. However, I feel we did not discuss adequately the research questions which need to be addressed and the methodology to be employed following disaster. Even so, some useful views were expressed on this matter.

I detect a feeling amongst you that you lack confidence in your credibility as researchers. You seem to believe the planners and combat authorities won't acknowledge the importance of the research work which you and others are doing. If my suspicions are correct, I suggest that it is important that you act positively to prove the importance of your research efforts to them as planners and combat authorities. In particular, it seems that there is a need to establish the importance of research in the minds of the bureaucracy at all levels of government, but particularly at local government level,

and with the disaster-affected community. Based on the record, this will be no easy task, but it is a task that I believe you must concentrate on.

I'll be bold and suggest that you - the researchers - must be seen to be providing an essential service (by the cogent results of your research) to the planners and operators to improve your credibility.

I believe also, that you should heed the advice which Dr Leivesley offered, that we don't want to waste our relatively meagre research effort by re-proving earlier research efforts or re-learning. There are too many unresearched areas of Australian disasters to allow this to occur; and, you will recall that Professor Raphael called for collaboration and co-operation. While many researchers feel that co-ordination of their efforts in the national interest could be an impediment, I don't share their views. Co-operation, co-ordination and close collaboration between all researchers - particularly on an inter-disciplinary basis - is surely essential.

Your deliberations have highlighted the importance of researchers becoming involved in the planning process. While it is up to you to ensure that this occurs, this College will play its part in indicating the importance of using the talents of those who are involved in disaster research to assist in the planning processes.

Many times during our discussions the importance of conducting research over an extended period has been emphasised and, yet, it seems that insistence on confidentiality, which was highlighted in Dr Clayer's presentation, inhibits the researcher in this regard. It seems that steps need to be taken to ensure that the genuine efforts of the researcher should be facilitated by the bureaucracy rather than impeded. In the wake of disaster, the attention of those who are charged with bringing about the recovery of the disaster-affected community tends to concentrate on operational aspects. These individuals normally have so many immediate problems on their mind that the intrusion of researchers at this time is regarded as an unnecessary and intolerable luxury. For this reason, it is absolutely vital, in my opinion, that you must attempt to become involved in the planning processes and to improve your credibility - and, if you do become involved, you must make sure your contribution is really worthwhile. It is unfortunate that we did not have time to engage in small-group discussion, to form special interest groups to exchange views formally or, even, to do justice to any of the papers which were presented. However, this is the first of what I believe will be an on-going

series of disaster research workshops. Having opened the batting with this one, we will be endeavouring to ensure that we continue, at reasonable intervals, to conduct follow-up research activities.

I believe it is important that machinery should be established to permit the exchange of research information by way of a news letter. In addition to merely exchanging information, I believe that the news letter could also assist in closing the gap between the researchers, planners and operators.

From my point of view, I thought that Professor Budd highlighted the importance of looking at the total system when he spoke to us on epidemiology. He suggested three steps:

- *Look closely at what is going on.

- *Draw conclusions from your observations, and

- *Apply the lessons which are drawn from your conclusions in practice.

There is no doubt that the papers which have been presented, have looked closely at what is going on and drawn very useful conclusions from their observations. It is important, however, that the lessons drawn from those conclusions should be applied in practice.

I can't close without mentioning the vexed question of funding. Prof Kearney's view is, I'm sure, valid: "funding for research follows disasters whereas it should precede it."

Thank you all, once again, for your attendance and for your contribution to the success of this Workshop.

AUSTRALIAN COUNTER DISASTER COLLEGE

RESEARCH WORKSHOP - HUMAN BEHAVIOUR IN DISASTER IN AUSTRALIA

25 - 27 April 1984

LIST OF ATTENDEES

Dr E F Berah	Dept Psychological Medicine Monash University Prince Henry's Hospital, Melbourne
Mr P E Berry	Ministry of Civil Defence, Wellington, New Zealand
Assoc Prof R Blong	School of Earth Sciences, Macquarie University, North Ryde, NSW
Dr B Boman	Dept of Veterans Affairs, Repatriation General Hospital, Concord, NSW
Mrs C Bookless-Pratz	Mental Health Research & Evaluation Centre, Glenside, SA
Mr N R Britton	Dept of Behavioural Sciences, James Cook University, QLD
Mr W J Buckingham	Mental Health Division Health Commission of Victoria, Melbourne
Assoc Prof G M Budd	Commonwealth Institute of Health, The University of Sydney, NSW
Prof E R Chamberlain	Dept of Social Work, University of Queensland
Mr P Cheney	CSIRO Division of Forest Research, Yarralumla, ACT
Miss A J Clarke	Dept of Psychology, University of Adelaide, SA
Dr J Clayer	Mental Health Research & Evaluation Centre, Glenside, SA
Dr P G Cook	Sunshine Hospital & Health Services Complex, St. Albans, Vic.
Mr G Croft	C/-Flinders Medical Centre, Bedford Park, SA
Dr J R Cronin	Royal Park Hospital, Parkville, Vic

LIST OF ATTENDEES (continued)

Dr M J Fairly	Royal Alexandra Children's Hospital, Camperdown, NSW
Mr W N Frehse	Psychology Honours Student, La Trobe University, Bundoora Vic.
Dr M Frost	Royal Adelaide Hospital, SA
Mr B J Grear	Deputy Director General, Dept of Technical & Further Education, SA
Dr J McL G Grigor	A/Director, Metal Health Division, Health Commission of Victoria, Melbourne
Dr J M Innes	Dept of Psychology, University of Adelaide, SA
Dr H J Jones	Royal Children's Hospital, Parkville, Vic.
Prof G E Kearney	Dept of Behavioural Sciences, James Cook University, QLD
Mrs S Leivesley	Consultant Social Scientist, Rainworth, QLD
Mr L R Lester	Insurance Council of Australia, Melbourne, Vic.
Dr A C McFarlane	Dept of Psychiatry, The Flinders University of South Australia, SA
Dr A R Michaelis	Interdisciplinary Science Reviews, Hillview Gardens, London, England
Mr E P Milliken	Psychologist, Research Consultant, Darwin, NT
Mr J A Nimmo	Australian Red Cross Society, East Melbourne, Vic
Prof J Oliver	Hon Research Adviser, Dept of Geography, University of Queensland, QLD
Mr D R Packham	National Centre for Rural Fire Research, Chisholm Institute, Vic.
Dr J Price	Head, Dept of Psychiatry, Royal Brisbane Hospital, QLD

LIST OF ATTENDEES (continued)

Prof B Raphael	Head, Dept of Psychiatry, University of Newcastle, NSW
Mr J D Scroope	A/Assistant Director General, Commonwealth Dept of Social Security, ACT
Prof B Singh	Monash University Dept of Psychological Medicine, Royal Park Hospital, Parkville, Vic.
Dr P Valent	Psychiatrist, Jolimont, Vic.
Dr M Wallace	Dept of Psychology, La Trobe University, Bundoora, Vic.
Mr D J Withers	Commonwealth Dept of Health, ACT

AUSTRALIAN COUNTER DISASTER COLLEGE

WORKSHOP ON HUMAN BEHAVIOUR IN DISASTER IN AUSTRALIA

25 - 27 APRIL 1984

PROGRAM

Wednesday, 25 April 1984

By 6.30 pm Assemble at ACDC
 7.00 pm Dinner

Thursday, 26 April 1984

8.30 am - SETTING THE SCENE

11.30 am Introduction to the Workshop
 (includes morning tea)

Brig I G C Gilmore
 Dr M Wallace

"Psychological Response to
 Disaster: What are the key
 Parameters for Research."

Prof B Raphael

"Applications of Research
 to Discussion Planning"

Mr B J Grear

"Ethical Aspects of Disaster
 Research"

Dr B Singh

11.30 am - STUDIES OF RECENT BUSHFIRES

2.15 pm "Psychiatric Disorder in
 (includes Primary School Children
 lunch following a Natural Disaster"

Dr A C McFarlane

"The Effects of Bushfire
 Disasters on Firefighters"

Dr M Wallace
 Dr P G Cook

"Preparedness for Bushfire"

Dr J Price

"Social Support and Adjustment
 following Disaster"

Dr M Wallace
 Dr P G Cook
 Mr W N Frehse

2.15 pm - ORGANISATION OF WELFARE SERVICES

"Twelve Months after the
 Bushfire a Follow-up Study
 of the 1983
 South Australian Bushfires"

Dr J R Clayer
 Mrs C Bookless-
 Pratz

"Planning for Mental Health
 Counter Disaster Services:
 Victoria's Experience on
 Ash Wednesday"

Mr W L Buckingham
 Dr J McL G Grigor

"Assessment of the Bushfire
 Relief Unit"

Dr M E Frost
 Dr A C McFarlane

"Welfare Policy and Disaster" Prof E R Chamberlain
Dr S Leivesley

"Public Views on Disaster Response and the News Media - Some Australian Examples" Assoc Prof R Blong

"Conceptual Alternatives for the Analysis of Counter-Disaster Organisational Networks" Mr N R Britton

6.00 pm for WORKSHOP DINNER Dr A R Michaelis
6.30 pm Dinner Address - Editor,
"Inter disciplinary Inter-disciplinary
Disaster Research" Science Review (UK)

Friday, 27 April 1984

8.30 am - GENERAL ISSUES IN DISASTER

10.15 am (includes morning tea) "The Vietnam Veteran as Disaster Victim" Dr B Boman

"Tropical Cyclone Oscar (1983): Psychological Reactions of a Fijian Population" Dr M J Fairley

"People who Experienced Cyclone Tracy: Human Responses" Mr E P Milliken

"The Southland Flood: an Organisational Approach to Disaster" Mr P E Berry

10.15 am - HELPERS AND WORKERS IN DISASTER

12.30 pm "The Role and Reactions of a Mental Health Team involved in the Victorian Bushfire aftermath" Dr E F Berah
Dr H J Jones
Dr P Valent

"The Response of Fire Fighters to Disaster and the Possible Role of Social Support" Dr J M Innes
Ms A J Clarke

"Post Traumatic Stress Disorder in Fire Fighters: Ash Wednesday" Dr A C McFarlane
Mr G Croft

"The Epidemiology of Disaster" Assoc Prof G M Budd

"Insurance Response to Natural Disaster" Prof G E Kearney

12.30 pm - LUNCH

1.30 pm

1.30 pm SUMMING UP

3.30 pm General Discussion

Chaired by Prof B Raphael

Close of Workshop

Brig I G C Gilmore

Vote of Thanks

Dr A C McFarlane

4.00 pm DISPERSAL

Bus departs for Airport

HUMAN BEHAVIOUR IN DISASTER IN AUSTRALIA

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PSYCHOLOGICAL RESPONSE TO DISASTER: WHAT ARE THE KEY
PARAMETERS FOR RESEARCH?

Beverley Raphael
Foundation Professor of Psychiatry
Faculty of Medicine
University of Newcastle

The patterns of psychological response to disaster have been vividly described by many workers, from Wolfenstein's classic volume, *Disaster: A Psychological Essay*(1), to the powerful documentation of the horror of Buffalo Creek in K. Erikson's "In the Wake of the Flood"(2). The possible psychopathological consequences have also been studied by many workers, for instance as reviewed by Kinston and Rosser(3), and demonstrated in recent studies, e.g., Adams and Adams(4); Holen, Sund and Weisaeth(5); Wilkinson(6), Patrick and Patrick(7); Bromet, Parkinson, Schulberg et al(8).

Various rationales may be proposed for the scientific study of psychological response to disaster. It may be studied for counterdisaster management objectives: to define patterns of response to warning, threat and impact of disaster; and behaviours in the inventory, rescue and recovery phases that follow.

Adaptational, survival oriented responses may be identified. Non-adaptive responses may be predicted or managed. Much of the research relevant to this view has come from sociologists (e.g., Quarantelli⁽⁹⁾). Weisaeth attempted to examine these factors in a factory fire and has drawn some valuable conclusions⁽¹⁰⁾.

Psychological response to disaster may also be studied for the purpose of defining pathological outcomes in terms of health generally, or specifically psychiatric disorder; or other forms of decompensation. The ultimate aim in this case would be to examine correlating factors and possible service implications so that such pathological outcomes could be prevented(11,12,13) or managed (14,15,16,17).

A third purpose may be for the consideration of a stress model, which in the natural experiment context of disasters, may give clues to stressor and response effects applicable to other situations. The disaster as stressor has been considered theoretically(4), and in the life event context(18), where it has been compared and rated with other stressors and their effects. Adam and Adam(4) have a stress-reaction model for their research into the consequences of the Mount St Helen's Ashfall. Certainly some of the general symptomatology that appears after disaster(19) may be similar to that found after personal disaster stresses such as bereavement(20). Related to this is the possible effect of disaster as a stimulus

challenge as reported by the workers noting the "therapeutic community" that may occur in the post disaster period, and by Williams and Parkes(21) in their paper on increased birthrate and community in Aberfan. A similar effect is noted by some disaster helpers(22) who found their close encounters with death made them re-evaluate their lives and relationships more positively.

Purposes of research may overlap with motivations, which may have many levels: scientific curiosity; altruism, among the more positive; attempts to work through and comprehend meanings of life and death amongst the most natural; politics, ambition and voyeurism, perhaps reflecting real but not always attractive human motivating forces.

The questions psychological research into disaster may wish to address are many, and will of course be related to the purposes of the research. They include the following, and probably many others:

- i) What are the "normal" and "pathological" patterns of psychological response following disaster? What behaviours occur as a consequence of these? How many show which patterns for how long? Who are affected?
- ii) What factors about the disaster cause or correlate with these? What are the stressors? What are the stimuli?
- iii) What background variables cause or correlate with these?
- iv) What intervening variables cause or correlate with these?
- v) What interventions may modify the psychological responses to disaster?
- vi) What are the changes over time?

Many other subcategories of question, or general questions could be generated. Operating in a broader sociological framework, community variables would also be queried. Biological variables may be the source of questions because of their links to stressor effects or a more complex consideration of the biopsychosocial model.

Which question or questions the researcher chooses to ask will depend upon the purposes, but also he must be influenced by methodological issues. For instance, it may not be possible to adequately assess or measure some variables. Moral, humanitarian and ethical constraints may mean that some research questions are in themselves too stressful or difficult to answer in the context of the disaster trauma. Sampling problems may arise with needs of selection, representativeness and size, plus

the difficulties of defining and working with an appropriate control group so that the research question could not be answered with the available populations. Timing of research may be problematic with different timing necessary for different questions. Victims and those affected may be inaccessible because of the confidentiality and dislocation, or because of shock and injury.

The vital and practical issue for researchers rests in defining the questions that can be asked of the populations affected by a particular disaster, and then developing a protocol and techniques which can validly answer these questions, taking into account the human realities of the disaster experience.

The remainder of this paper attempts to identify the key parameters that must be addressed in the psychological response to disaster.

"PRE"-DISASTER MEASURES

It is extremely unusual to have a closely investigated population, on whom all the relevant variables have been examined prior to a disaster. Nevertheless, where there is some anticipation of the likelihood of disaster it should theoretically be possible to accomplish this by systematic survey of the population likely to be exposed. Such a survey might examine not only basic demographic variables, previous "abnormality" in the form of current or past psychological disturbance, past experience of and response to disasters, but could also estimate perception of anticipated response to the potential disaster. I believe there has been a survey of this type carried out in Hawaii in anticipation of volcanic eruption, but, to date, I have been unable to find this study reported.

Another way in which "pre" information may be found is if a region has been fortuitously studied for another purpose before the disaster occurs. An example of this is the study of perception of fire hazard carried out by H. Abrahams in the Adelaide Hills, long before the disastrous Ash Wednesday fires. This did not provide information on pre-existing personality or other factors, but did have some useful information concerning perception of threat and response to such perceptions (e.g., failure to take preventive action in most cases).

When the "pre" information is not available from such sources, some may be sought by examining an independent variable for its occurrence before and subsequent to the disaster. Health care utilisation could be one variable examined in this way. Health records could be examined before and at specified times after in both affected and control non-affected communities. This could detect a change in health seeking behaviour associated with the disaster experience. Specific areas could be examined such as medication utilised. Mental health care utilisation could also be examined in this way, e.g., psychiatric hospitalisation rates pre and post in affected and non-affected communities, or differentially affected groups(8,23).

Other less specific measures or indices in the fields that may be linked to stress or disaster and its psychological impact can also be examined in this way. For instance, indices of heart attacks were scored after the Athens earthquake⁽²⁴⁾.

Similarly it would be possible to determine marital breakdowns, crime⁽²⁵⁾, and so forth - perhaps as correlates of a psychological change induced by disaster experience. These gross indices have value in large population samples, particularly when there are closely matched groups which can be compared. "Ideal" pre and post measures could include at least the following: psychiatric hospital admissions and treatment rates; suicide and attempted suicide rates; drunk driving; delinquency and crime rates; sickness benefit rates; marital breakdown; child abuse notifications; stress disease rates and possibly others. For this method to have value there must be good and reliable statistical bases before and after. And, of course, some disasters are such that they could lead to loss of records or disruption of recording systems or data collection, negating the conclusions that might be drawn.

From indices a gross picture of possible psychological response to disaster may be assumed. For a fine-grain analysis of pre and post effects in differentially affected communities what would be the "ideal" "pre" measures?

Demographic variables suggested as being significant in response to stress or disaster include age, sex, marital status, and position in family, and family constitution, race and ethnic background, religion, socioeconomic status, occupation and employment.

Psychological background measures suggested by either theory or research to be relevant include personality and coping styles. Measurement of these two variables is notoriously difficult, but epidemiological studies in the community such as those of Henderson⁽²⁶⁾ would suggest that the Eysenck Personality Inventory, particularly the neuroticism scale, may be an important predictor of subsequent disorder. A potentially useful coping inventory may be that of Parker and Brown⁽²⁷⁾, which examines a range of coping styles people believe they would use if faced with a stressful experience or when depressed. These include crying, self-consolation, eating, reckless behaviour, talking with others and so forth. It would be quite possible to orient this coping scale to an anticipated disaster stressor, or to pick up the respondent's perceptions of his responses to other related or similar threats present, past or imagined. It might even be possible to examine separate coping styles for the three main areas of disaster stressors, to be discussed below: death and destruction experience; loss experience; dislocation/relocation.

A further psychosocial parameter suggested as important in the face of adversity or threat is the perception of social network support(26), and specifically attachment ideation and behaviours (28).

It would be useful in the "ideal" "pre"-test situation to have reliable and valid measures of the individual's perception of his family and social network support, particularly its perceived adequacy.

Close attachments are especially important in this context and the protective value of an intimate and confiding marital relationship comes through as a strong variable⁽²⁹⁾.

Vulnerability to a pathological response may be associated with a previous history of pathology, i.e., past or present psychiatric disorder. While this is not a clear-cut relationship, it would seem appropriate to explore past, or even current psychiatric disorder. The measures for achieving this vary enormously from a simple recording of the respondent's memory of such according to specified criteria; the assessment of past records; life-time diagnosis questionnaires or interviews; trait measures of anxiety, such as the Spielberger Trait Anxiety Scale, or present state assessments by questionnaires through state measures such as the General Health Questionnaire of Goldberg, and Spielberger State Anxiety Scale, or Zung Depression rating; or present state interviews such as the Present State Examination of Wing, or the Diagnostic Interview Schedule of Lee Robins, or the PERI of Dohrenwend. It is difficult to imagine all these measures being accumulated in anticipation of a disaster and examining its effects for even the predictable disasters are difficult to predict in timing and affected groups. Nevertheless, many of the current larger epidemiological studies could have, "fortuitously", a data bank of this kind which could be utilised as a "pre" data resource should a disaster occur.

One other variable that could make some contribution is the person's physical state or other concurrent stressor. The person who is ill or handicapped, or experiencing ongoing stress or major life crisis may be in a more vulnerable state. These measures could be noted by scoring a life event schedule, such as the Tennant and Andrews Scale, or question or interview to estimate their presence and stressful effects. It is probable that some aspects would be detected in the present status measures if highly stressful (e.g., G.H.Q., etc.), but not all may exert such effects; many only do so if disaster were imminent e.g., being paraplegic and limited in mobility and opportunity, for example.

The final area of importance is that of disaster specific perceptions and responses. The person's previous experience of and response to similar disasters, or to related stressor experiences of death and destruction, loss and grief, dislocation

and relocation, may be predictive of response to future disaster. There are no systematic scales or schedules to examine this and questionnaires or interviews would have to be developed. The other aspect is the current perception of threat from the disaster, the behavioural responses, or the threat and the anticipated response to actual disaster. Again, these would have to be explored by devised questions of relevance. Some preceding views of threat can be carried out when threat is prolonged with specific interview schedule or questionnaire such as prior to the Mt St Helen's Volcanic eruption⁽³⁰⁾.

These "Ideal" pretest measures are rarely available beforehand. Once the research takes on the post disaster framework, then they become subsumed under the background variables that must be estimated and taken into account. Then, of course, they are subject to further possible distortions by the affective and other responses of the disaster experience which becomes central.

DISASTER STATE MEASURES

In considering research questions that deal with the psychological response to disaster, estimates of the disaster experience itself as a stimulus/stressor are essential. This is one of the most poorly investigated components in most studies, and it is quite clear that a number of elements must be quantified to make the trauma concept meaningful.

Primary qualities of disaster include intensity and duration. But most disasters are a complex amalgam of forces and events, some of which are intense and immediate, others ongoing and yet others delayed. A single event, such as a factory fire, may have many related consequences that add to or constitute the trauma. A cyclone or fire may have a terrifying and forceful impact over many hours followed by profound destruction of the environment with ongoing associated losses and deprivations for many months. Even in the impact of a single disaster, what is experienced by different victims may vary enormously. For example, in the fires there may have been several different threats to life including choking from fumes, crushing by collapse of structures, burning to death or death from radiant heat.

At present we have not defined all the relevant parameters that may be quantified across different disaster experiences, nor specific measures for them. However, some disaster researchers have attempted to examine intensity of exposure by closeness to the centre of a disaster impact. Weisaeth⁽¹⁰⁾ in his total population study of a Norwegian paint factory fire was able to locate the positions of all workers in the factory when the explosion and fire occurred. He divided his subjects into three groups, A-C - A being maximal exposure. He was able to show that maximal exposure correlated with maximal traumatic symptomatology afterwards, with relatively diminishing rates in

the other two groups. A somewhat similar technique was used in the Three Mile Island study, but on a larger and less intense scale, for this was a disaster more of threat than actuality of destruction⁽⁸⁾.

Duration is difficult for most exposed victims experience a similar duration of say a cyclone's impact. Theoretically, it might be possible to examine effects of prolonged threat, as McFarlane suggests for some of his subjects in the Ash Wednesday fires, where one town suffered prolonged threat from the fire which seemed to produce significantly increased problems for those involved⁽³¹⁾.

The component threats to disaster experience have perhaps been most closely considered by the Norwegian disaster workers, particularly in their attempts to understand the responses to the North Sea Oil Rig Disaster⁽⁵⁾. They have a list of threats including death, destruction, loss, conflict over escape/assisting others. In a review of this and other disasters, Raphael⁽³²⁾ draws conclusions that the three main classes of threat or trauma to be considered in their occurrence, intensity, frequency and duration are: death/destruction; loss; dislocation/ relocation.

Death/destruction threats and traumata are those where the victim's life or body is threatened by the physical forces of the disaster and its consequences, or he is exposed to the death/ destruction of others' bodies in massive or traumatic ways. The threat of special or massive animal death/destruction, or special or massive property destruction may also have effect, but the key element seems to lie in the "death" component for most of those who are severely affected. This effect is often condensed in the traumatic screen memories of the disaster. It is highlighted in vivid descriptions of overwhelming scenes of death and destruction as experienced by the Buffalo Creek disaster survivors (2). The difficulty of quantifying such experience is pronounced. No systematic measures as yet exist, but useful questions include whether the victim felt his life was threatened; if he thought he was actually going to die, or death was inevitable; was he seriously injured; did he see others die or dead or seriously injured or mutilated; or mutilated bodies; how extensive and intensive were such experiences. The effect of this traumatic experience may be measured to some degree by the Impact of Event Scale of Horowitz which will be discussed subsequently. This area of threat/trauma is identifiable from the earliest stages after the disaster experience, unlike the following:

Loss Threats and Traumata are those which occur following personal or property loss. The person may have been bereaved by the death of his primary attachment figure or a close family member, or someone more distant but still emotionally important to him. He may be bereaved over the many deaths of strangers. He may grieve for a beloved pet. There may be loss of valued

personal possessions with strong symbolic emotional attachment, or of property, home and means of livelihood. In the early phase after a disaster, losses are gradually identified as the "inventory" process occurs. The euphoria of survival, or shock and denial may mean that responses to the losses are not evident, however, and may not be for some weeks. The ensuing deprivations are also increasingly experienced as time goes on. Again there are very few systematically developed measures. McFarlane(33) has developed questionnaires which list losses, personal (i.e., people) and property, and this format could usefully be adopted in other disaster research, i.e., a simple inventory of actual losses. Perceived losses could be added, but would be a much softer measure.

Reactions to loss, i.e., experience of loss/grief measures are also important in this context. The Texas Grief Inventory(34) could be utilised as a state measure. Singh(13) has devised a useful scale which includes state questions, behavioural coping questions and a question about whether or not the body was seen after death. This latter scale has been used to investigate responses in bereaved victims following the Granville train disaster. Further development of measures in this field is essential.

Dislocation/relocation stress/trauma concerns the aspects of dislocation of the person from his family and/or natural environment including home and neighbourhood and the relocation to hospital, other accommodation, social network or community, including temporary rehousing. While separation and dislocation may occur acutely and transiently, they may be very prolonged and contribute significantly to the chronic stresses of the post disaster period. Spontaneous comments by many disaster victims, especially after natural disasters where dislocation and relocation are more likely, indicate the severity and unpleasantness of this ongoing component. This appears clearly in effects on the evacuated victims of the Darwin cyclone(35,36), in the descriptions of the loss of community and its effects following the Buffalo Creek disaster(2), and in descriptive comments following the Ash Wednesday fires. Again there are no systematically defined measures for this variable. However, McFarlane (37) has attempted to define duration of separation of children from their parents and found it to be a significant contributor to their subsequent distress. Measures should include estimates of separation of family members from one another including numbers and duration; move from home or familiar neighbourhood, including evacuation duration; period of time in temporary housing; time absent from familiar work environment; extent of community destruction or breakup. Impact of this trauma component is difficult to measure as it seems to fuse with general stressor effects and responses.

Thus there is a need to develop, test and refine measures of these disaster stressors, perhaps by starting to examine them in the personal disasters of everyday life. They need to be developed in a simple and reliable format that can be readily adapted to use in the many different disasters that may occur.

SHORT TERM AND THE IMMEDIATE POST-DISASTER PHASE

The psychological investigation of the early days and first few weeks after the disaster can achieve only some indication of response and reaction, and an inventory of experiences: death/destruction; loss; dislocation. As noted previously, the "pre" test variables that are potentially relevant may be explored, but this is often difficult to do in the intensity and upheaval of the post-disaster period, and only the basic demographic variables may be possible. While personality measures may be of use and coping styles of interest it is possible that, if the reaction to the disaster is intense, response patterns may be influenced.

Thus at this stage the variables to be explored are more relevant to answering questions of stress/response, adaptational behaviours and possible predictors of longer term pathology or successful adaptation.

A description of behaviours and experiences during and after the disaster may usefully be obtained. This will provide information on the nature and extent of stresses suffered, including any conflicts.

This inventory of stressors should specifically enquire about experience of death/destruction, noting whether or not the person's life was threatened, their injuries and whether or not they saw others dead, dying, trapped or injured, and the detail of any particularly horrifying memories. Losses of person and property should be innumeraled in detail. Dislocations from family members (i.e., separations) should be noted and their frequency and duration, as well as dislocation from home and community, its duration or likely duration and the nature of relocation.

The reactive behaviours should be identified in terms of emotional release, activity, denial of effect, arousal levels, interpersonal interactions, attempt at mastery, ongoing non-responsiveness, exaggerated behaviours, inappropriate or self-damaging or destructive behaviours. The primary attachments, their presence or absence, as well as the perceived supportiveness of others should be specifically examined. While shortened questionnaire formats from an instrument such as the ISSI (Index for Social Support Integration) of Henderson's group can be used, it is probably better to ask the specific questions required such as the presence and availability of main relationships during and after the disaster, concerns for them, attachment images or behaviours, and the way they influenced response,

and the current perception of them, their adequacy and availability. These are probably best explored in a review interview or open-ended questionnaire which asks questions about what happened, what the affected person felt and did, what were the inter-actions with others, etc. This should explore from the time before the disaster when first warning was given, until the time of enquiry. Specific stages of the disaster can be queried, e.g., impact, and what was felt and done. Specific threat/traumata components may be queried. Specific behaviours may be enquired for e.g., the disaster syndrome of dazed response; whether it was present and how long it lasted; or panic, the circumstances under which it occurred, and what the consequences were.

There are no systematically developed measures that can be used to measure the reactions to the disaster, so questions must be developed taking into account the main time frames and parameters described above. The review format is optimal, for it is logical to the affected person, and often helpful in assisting him to externalise and master the experience as well as providing the descriptive information required.

The earliest stages of response to some of the traumatic components may be estimated at this time by simple state measures. The General Health Questionnaire of Goldberg has been useful in the immediate post disaster period for providing a quantification of the level of psychological distress. This is useful too for in personal disasters such as bereavement high initial reaction has been found to be to some degree predictive of subsequent disturbance and poor resolution. Parker's study of Darwin Evacuees showed high initial levels to be reflective of the death threat reaction and later levels more associated with dislocation stressors.

There is some debate about which form of the General Health Questionnaire is best used. The 12 item seems to provide a satisfactory index of general distress which is all that can be assumed at this early stage, for "caseness" could not be concluded in the face of such severe stressors and the short time span involved. The use of the 28 item scale could distill out further anxiety and depression at this stage, but whether this is a valid procedure remains to be established. It must be borne in mind that the aroused or distressed victim may not be in a state for, or motivated towards, the completion of lengthy questionnaires whose relevance is limited.

The Impact of Event Scale of Horowitz may show some of the specific symptomatology, of post traumatic stress. Arousal, startle, exaggerated response to stimuli, intrusive cognitions, plus associated affects and nightmares of the disaster may be prominent. Some measure of these symptoms in the early weeks is useful as it promotes a profile against which these responses may be monitored subsequently. These reactions have been shown in Weisaeth's study(10) of his factory fire victims, where he

tended to classify these early responses as post traumatic anxiety or symptoms, but not as disorder. McFarlane(33) has similarly commented upon these early symptoms and noted their low correlation with GHQ, for it seems, and Goldberg concurs, that this instrument has not been designed to detect the post traumatic stress symptomatology.

For the most part loss reaction questionnaires are not relevant for this time, for most of the items cover responses which would be considered part of the bereavement process. Relevant reactive aspects will probably be detected in the general stressor effect in the GHQ. The early shock denial phase may also be prolonged by the other overwhelming and traumatic aspects of the disaster experience, making it difficult to estimate any effects of or reactions to losses.

As psychiatric morbidity to the level of psychosis or clearly defined syndromes apart from the above appears infrequent and difficult to distinguish from reactive aspects, it is usually inappropriate to explore this in a community sample recently affected by a disaster. However, some general questions can be asked about whether the person has experienced any unusual phenomena, about physical health, perhaps as a brief checklist, and any doctor or other visits. This area of question may detect early pathological patterns, but on the whole, the practical realities of the disaster and its aftermath, the pre-occupation with the experience and the tasks it involves, ongoing shock effect, all mean that in these early weeks few patterns develop and the general stressor or impact responses are the ones most likely to be delineated.

In review then, the extent and depth of investigation of the psychological parameters in the early post disaster weeks may be strongly influenced by the severity and extent of the disaster. The key aspects involve the demographic variables, some review of the disaster experience, its stressors, and its interpersonal aspects, and a reactive measure such as the General Health Questionnaire and possibly the Impact of Event Scale. In the situation where victims are less stressed, more extensive investigation of "pre test" parameters and response to the disaster can be considered along the lines outlined above.

INTERMEDIATE TERM POST DISASTER ASSESSMENTS

After the first 2-3 weeks, the acute psychological response to the disaster starts to settle, but reactions to some of the more severe stresses and to ongoing difficulties created by the disaster start to emerge from the general distress. Grief becomes much more pronounced, and is likely to continue over the early months when the loss has been severe. Sometimes the other traumata of the disaster, plus the practical demands to reconstitute a home and environment mean that the grief response may be delayed or masked.

Assessments may be conducted at one month post disaster, two months post disaster, three and so on; six months post disaster; a year later and so forth. Decisions as to timing depends on the purpose of the research. If it is intended to develop a profile of response over time, repeated assessments of distress levels or particular phenomena such as post traumatic stress effects or loss resolution may be used. If, on the other hand, the purpose is to estimate the development of psychopathology or disorder consequent upon the disaster, then assessments at 3 months may give an indication or 6 months, while later would be chosen to estimate longer term and more entrenched pathology outcomes. The two types of assessment, i.e., profile and morbid outcome will be described, bearing in mind both may be combined and the former may be used as a correlate or predictor of the latter.

Profile of Reactions to Disaster Stressors

Such a profile should include measures of general distress such as the General Health Questionnaire, a measure of specific impact, such as the Impact of Event Scale. Where loss has occurred, the loss questionnaire of Singh or the Texas Grief Inventory can be utilised, or a scale using related questions relevant to the actual loss. Repeat of these measures at intervals will give a profile of the phenomenology of stressor response associated with them.

The measurement of dislocation/relocation stressors is more difficult. To the author's knowledge there are no instruments designed to investigate psychological response that may be specific to these variables. It is important to quantify the stressor, as noted in the previous section, in terms of number and frequency and duration of separations from home and family. The quality of replacement or temporary housing, and its duration may be indicated by notation of size, crowding issues. The siting of relocation may be important in the access to service, work, recreation and in the quality of neighbourhood. Fried⁽³⁸⁾ suggests social interaction aspects of residential attachment may only be significant for some, many valuing privacy more; and that attachment is more related to the quality of housing, neighbourhood and environment, and things like access to nature.

Dislocation/relocation have to be defined in terms of the degree to which they are ongoing stressors, as opposed to limited duration. Most disasters do not include ongoing death/destruction and loss threats or traumata beyond the original incident, unless the disaster continues - as in war. Other chronic stressors may develop as a consequence of the disaster - e.g., unemployment, and these need to be enquired for. This may best be done using a life event schedule which contains all relevant items and the options here range from Holmes and Rahe's Schedule of Recent Events to others such as Tennant and Andrews' scales. Extra disaster relevant items may have to be added.

Possible reactive effects specific to dislocation/relocation may appear in alterations of family functioning. Clinical experience following the Darwin cyclone suggested that dislocation/relocation could have an impact on marital harmony and perhaps through this variable or independently on the reaction of children. McFarlane⁽³⁷⁾ is currently examining such influences. It is probably useful to specifically query for effects on marriage, parent child-relationships and child behaviour to clarify such possibilities further. There may be increases or decreases in the time family members spend together, increases or decreases of friction and arguments, increases or decreases of closeness and affection. There may be similar repercussions through the social network. The current question format of the ISSI (Henderson) seems inappropriate as a measure for such changes. The Tucker⁽³⁹⁾ brief social support checklist could be used, but is also somewhat inappropriate to the context. Questions based on the above parameters and with a range of options would probably be the most useful format in the current state of research development, and eventually strong items might be developed into a measure.

Satisfaction/dissatisfaction with current situation is a further reactive measure which could be utilised; satisfaction being estimated in terms of site, duration, physical environment, size and so forth of relocation situation. Again a scale could be developed using such items.

General disturbances of physiological functioning which have not reached the level of disorder may reflect general stressor effects from any or all of the above, and particularly from those stressors that are ongoing. Sleep, appetite and weight, arousal levels, energy levels and fatigue, even bowel and bladder disturbances, sexual interest and functioning could be enquired for a simple checklist. Finally, it is worthwhile to ask the affected person about any changes or reactions he believes to have occurred in response to the disaster.

Norwegian workers^(5,10) from the Centre of Disaster Psychiatry at the University of Oslo, have a very useful 10 item checklist, the Hosuwe Scale which can be administered simply. Scoring on this measure correlates highly with subsequent morbidity. It is hoped that this scale will be further validated and made widely available to disaster workers generally.

Outcome Measures

Choice of outcome measure will be defined by the parameters of outcome that are selected for research. Potential areas are: psychiatric disorder; physical ill health seen to be a consequence of the stress; medication and health care utilisation; social disorder including marital and family breakdown, alcohol and substance abuse, criminality etc; functional impairment in work, social, recreational and other roles; improvements in any or all of the above or other areas of positive change.

In examining psychiatric outcomes post disaster, enquiry may cover specific syndromes such as the post-traumatic stress disorder using measures such as the Impact of Event Scale, or the criteria of categorisation such as in DSM-III. Or it may be that most possible psychiatric disorders are explored by utilising screening questionnaires strengthened by interviewing of a statistically determined representative sample. GHQ screening especially with 28, 30 or 60 items followed by the Present State Examination interview, or a similar methodology using the Diagnostic Interview Schedule of the N.I.M.H.. The evidence to date on psychiatric morbidity post-disaster suggests that such broadly based explorations may not be productive. More specific query might then again concentrate on affective disorder, utilising a screening such as the Zung and Interview Schedule for Affective Disorders. Independent measures of psychiatric outcome and utilisation could be obtained from hospitals and clinics serving the disaster area. Prescription levels of psychotropic medication could also be estimated. Suicidal behaviour might be a further outcome variable that could be assessed independently.

The measurement of physical ill-health seen as a consequence of stress is difficult. The method of Trichopoulos et al(24) in examining the incidence of fatal heart attack after the 1981 Athens earthquake was to abstract death certificates for the period under study and to compare the rates with carefully matched earlier periods. Adams and Adams used hospital emergency room visit rates as an index. Diagnoses at the local mental health clinic of stress related diseases, and medical clinic visits were further indices. Bennet(23) and the Three Mile Island Study(8) used such formats.

Thus most of the studies that have made comment on this component of physical or psychosomatic illness have used independent data. It would also be possible to screen disaster populations or samples on a check list of common complaints, e.g., headaches, heart disease, blood pressure, and so forth - their frequency and the utilisation of health care associated with them. The Cornell Medical Index or a similar health questionnaire could be utilised more systematically for such a population. Their own health records could be checked, with their permission. And finally, physical examination from simple blood pressure recording to detailed health check could be carried out. General epidemiological indices, plus a simple check list may be the most useful measures for most surveys.

General health care utilisation data in terms of doctor visits, admission numbers, bed occupancy, outpatients and emergency visits, medication levels could all be estimated. Such measures might best link with some of the earlier health data.

Social problems can also be investigated from questionnaire interview or independent indices. Questionnaires for marital and family function would need to be developed querying the specific aspects, and similarly for alcohol, substance abuse and criminality. The MAST or related alcohol questionnaire could be utilised, but a more appropriate format may be of diary recording of alcohol intake.

Interviews may be the most sensitive methods of exploring the quality of marital and family function, particularly if there is opportunity for systematic observation. Most of the structured family assessments and scales would be too detailed, unless this is the main purpose of the research. Bolin's study(40) has addressed family recovery after disaster most fully and he used structured interviews.

Independent indices in this area of disorder include marital breakdown in divorce and separation, child abuse, truancy and delinquency rates; for alcohol, drunk driving charges and alcohol related arrests; for criminality, criminal conviction rates.

Functional impairment in work, social and recreational indices could usefully be measured in questionnaire format by a scale such as Weissman's. Specific questions about work related capacities and recreational capacities can also be asked. Interview can systematically explore these areas in greater depth. Independent measures such as employment/sickness statistics, may add further strength to the data base of this outcome parameter.

It is most important that any exploration of disaster outcome include measures or assessments of possible positive outcomes within the form of improvements in above parameters, or perhaps in measures such as psychological wellbeing. Birth rates have been used to some extent in this manner.

Outcome assessment might usefully be carried out in the first instance at 3-4 months after the disaster. If this is the case it is particularly important that it be repeated later to detect any morbidity which has been delayed in its appearance. Assessment at nine months to one year is likely to detect this later appearing disorder, but it should be remembered that 11 months or 13 may be preferable to 12 months post disaster, so that the anniversary phenomenon is avoided.

Explanatory and Intervening Variables

The changes found at outcome, if any, may be explained by characteristics or experience that existed before the disaster, i.e., the "pre-test" range of variables. When there is no pre-test situation, these will need to be investigated in retrospect, perhaps even alongside outcome assessment, though preferably to some degree independent of it. Disaster variables may also need to be explored in retrospect, particularly if there

independent measure of them.

In the time between the disaster and the outcome measure intervening life events, apart from those brought on by the disaster, may occur and should be noted as possible explanatory factors. Similarly support, compensation, disaster relief programmes, counselling for disaster stress may all be interventions capable of modifying outcome and so must be carefully noted. The affected person's noting of these in questionnaire or interview, plus the independent measures such as data from relief programmes can all be correlated to examine the effect of this parameter.

LONG-TERM PSYCHOLOGICAL RESPONSES TO DISASTER

Few studies address the long-term psychological effects of disaster. Descriptive studies and clinical experience suggest that even the most horrifying and traumatic experiences fade in time, but that the disaster is often used as a reference point about which experience is organised. Vivid screen memories may persist for many years, and there may be some minimal phobic avoidance. Overwhelming disasters such as Hiroshima leave the victims permanently traumatised according to Lipton with phenomena of psychic numbing and psychic death. Systematic investigation, 2, 3, 5 or more years after a disaster has not been carried out. Epidemiological measures of community indices and disease rates, as well as social indices could provide a valid method if the data base was complete and the control communities or samples well matched. Permanent relocation of some members of disaster affected communities would lessen the validity of such measures, unless total population sample could be traced, as has been done in Norway(10). Interviews of selected groups would give indepth data, but would probably be most relevant with the severely affected and it is more difficult to find control groups for them.

Response to future disasters may be one long-term parameter worthy of investigation. Alterations in disaster reaction in those with and without the earlier disaster experience could give an indication of improved coping styles or vulnerability.

On the whole then the long-term effects may be best demonstrated in community indices on the one hand, or in-depth interviews of selected groups on the other.

SPECIAL GROUPS

Different measures and methodologies may be necessary for special groups such as children and the injured. Younger children show stress responses behaviourally, but their reactions may be associated with parental response by identification or as a secondary consequence. The investigation of children may have to rely on parental report measures with the young child, including behavioural checklists, and with the older child on parent plus teacher questionnaires in the method of Rutter's studies exploring behaviour in the two settings. McFarlane(37)

has been the first to systematically develop this aspect with children. Interview assessment is more difficult, especially with younger children, although Terr⁽⁴¹⁾ has maintained an interview therapy exploration of children's fantasies and responses following a kidnap disaster, to produce many interesting findings of the fine grained phenomena that can occur. Independent, objective measures can further strengthen the data base for children including absenteeism from school and academic achievement levels. This latter data is important, for workers such as Sonis and Costello have noted the discrepancies in rating of children's behaviour, from different professional raters such as teachers, psychiatrists, paediatricians and psychologists.

The injured might also be a special group. They may not be identified with other community members in sampling, because they are hospitalised. Distress levels and dysfunction from the injury may complicate questionnaire and interview assessments. Severity and nature of injury and its effects have to be taken into account, plus the dislocation/relocation of hospital.

Migrant and ethnic populations may have additional problems of language, communication and identification that should be assessed. Measures by questionnaire and interviews may have to be greatly simplified and/or translated. Visual analogue scales, once understood, may be helpful. Nevertheless, simplicity of measure is vital for those stressed further by cultural differences, as also with the severely injured.

Helpers, often called the other victims of the disaster, may be assessed along the parameters noted for other victims. Special aspects of disaster roles and their transitions, case loads and specific functions may be important influencing factors that require measurement in addition etc..

OTHER POSSIBLE MEASURES OF PSYCHOLOGICAL RESPONSE TO DISASTER

Behavioural response to disaster images or words such as response time, avoidance could be measured in experimental circumstances and compared in disaster affected and non affected persons. Psychophysiological measures such as the Galvanic Skin Response and Conditionability could also be explored in differentially affected groups. A particularly interesting area in terms of stress research would be the neuroendocrine axis, examining for instance corticosterol excretion patterns and blood levels. Engel examined response to experimentally induced sadness in this way by showing his subjects a film of the Aberfan disaster and testing hormonal response. Immune system response may also be tested as with Bartop's study of post-bereavement effects on T-Cell function⁽⁴²⁾. No doubt there will be many other fascinating possibilities.

CONCLUSIONS

Questionnaires may proliferate, interviews deepen, objective indices strengthen, but the ultimate end points of researching psychological response in disaster lie in the human who will respond to the questions and the horror he has experienced. For the most part the more simple and compassionate the measures, the more he may be able to offer that will increase our understanding of this field. And the more unified and co-ordinated the approach of disaster workers to systematise research in this field the broader will be the data base from which further development can occur.

REFERENCES

1. Wolfenstein, Martha. (1977). *Disaster: A Psychological Essay*. Arno Press, New York.
2. Kai T. Erikson. (1979). *In the Wake of the Flood*. George Allen and Unwin, London.
3. Kinston, W., and Rosser, R. (1974). *Disaster: Effects on mental and physical state*. *Journal of Psychosomatic Research*, 18:437- 56.
4. Adams, P.R., and Adams, G.R. (1984). *Mount Saint Helen's Ashfall*. *American Psychologist*, 39:252-260.
5. Holen, A., Sund, A., and Weisaeth, L. (1983). *Predictors of Disaster Morbidity*. Paper presented at Seminar on Disaster Behaviour, Stavanger, Norway.
6. Wilkinson, M.K. (1983). *Aftermath of a Disaster: The collapse of the Hyatt Regency Hotel Skywalks*. *American Journal of Psychiatry*, 140:1134-1139.
7. Patrick, V., and Patrick, W.K. (1981). *Cyclone '78 in Sri Lanka - The mental health trail*. *British Journal Psychiatry*, 138:210-216.
8. Bromet, E.J., Parkinson, D.K., Schulberg, H.C., Dunn, L.O., and Gondek, P.C. (1982). *Mental health of residents near the Three Mile Island Reactor: A comparative study of selected groups*. *Journal of Preventive Psychiatry*, 1:225-276.
9. Quarantelli, E.L. (1978). *Disasters: Theory and research*. Sage Publications, London.
10. Weisaeth, L. (1983). *The Study of a Factory Fire*. Doctoral Thesis. University of Oslo.
11. Raphael, B. (1979). *Preventive Psychiatry of Natural Hazard*. Chapter in *Natural Hazards in Australia*, Ed. J. Heathcote, Australian Academy of Science, Canberra.
12. Raphael, B. (1979-80). *A primary prevention action programme: Psychiatric involvement following a major rail disaster*. *Omega*, Vol. 10(3).
13. Singh, B., and Raphael, B. (1981). *Postdisaster morbidity of the bereaved: A possible role for preventive psychiatry*. *Journal Nervous and Mental Disease*, vol.169, No.4, pp.203-212.
14. Tuckman, A.J. (1973). *Disaster and mental health intervention*. *Community Mental Health Journal*, Vol.9(2), pp.151-157.
15. Okura, K.P. (1975). *Mobilizing in response to major disaster*. *Community Mental Health Journal*, Vol.11(2), pp. 136-144.

REFERENCES (Cont'd)

16. Cohen, R.E., and Ahearn, F.L. (1980). Handbook for Mental Health Care of Disaster Victims. The Johns Hopkins University Press, Baltimore.
17. Parad, H.J., Resnick, H.L., and Parad, L.G. (1976). Emergency and Disaster Management. The Charles Press Publishers Inc., Maryland.
18. Janney, J.G., Masuda, M., and Holmes, T.H. (1977). Impact of a natural catastrophe on life events. Journal of Human Stress, pp.22-34.
19. Abrahams, M.J., Price, J., Whitlock, F.A., and Williams, G. (1976). The Brisbane Floods, January 1974: Their Impact on Health. Medical Journal Australia, 2:936-939.
20. Raphael, B. (1977). Preventive intervention with the recently bereaved. Archives General Psychiatry, Vol. 34: 1450-1454.
21. Williams, R.M., and Parkes, C.M. (1975). Psychosocial effects of disaster: Birth rate in Aberfan. British Medical Journal, pp.303-304.
22. Raphael, B., Singh, B., Bradbury, L., Lambert, F. (1983-84). Who helps the helpers? The effects of a disaster on the rescue workers. Omega, Vol.14(1), pp.9-20.
23. Bennet, G. (1970). Bristol Floods 1968. Controlled survey of effects on health of local community disaster. British Medical Journal, pp.454-458.
24. Trichopoulos, D., Katsouyanni, K., Zagitsanos, X., Pzonou, A., Dalla-Vorgion, P. (1983). Psychological stress and fatal heart attack: The Athens (1981) earthquake natural experiment. The Lancet, pp.441-444.
25. Whelan, J., Seaton, E., and Dax, E.C. (1976). Aftermath: The Tasmanian Bridge Collapse: Australian Institute of Criminology, Canberra, 1976.
26. Henderson, S., Byrne, D.G., and Duncan-Jones, P. (1981). Neurosis and the social environment. Sydney, Academic Press.
27. Parker, G., and Brown, L (1982). Coping behaviors that mediate between life events and depression. Archives General Psychiatry, 39:1386-1391.
28. Henderson, S., and Bostock, T. (1977). Coping behaviour after shipwreck. British Journal Psychiatry, 131:15-20.
29. Tennant, C. (1984). Vulnerability to Depression. Paper presented at Australian Preventive Psychiatry Workshop on Depression, Newcastle, Australia, April.

REFERENCES (Cont'd)

30. Perry, R., and Greene, M. (1982). Citizen Response to Volcanic Eruptions: The Case of Mt St Helens. Irvington Publishers, Inc., New York.
31. McFarlane, A.C., and Raphael, B. (1984) Ash Wednesday Fires. Paper submitted for publication.
32. Raphael, B. (1984). Psychiatric Consultancy in Major Disaster: Editorial Review in Press in Australian and New Zealand Journal of Psychiatry, December.
33. McFarlane, A.C. Research into the Ash Wednesday Fires, 1983.
34. Faschingbauer, T.R., Devaul, R.A., and Zisook, S. (1977). Development of the Texas Inventory of Grief. American Journal Psychiatry, 134:6.
35. Parker, G. (1977). Cyclone Tracy and Darwin evacuees: On the restoration of the species. British Journal of Psychiatry, 130: 548-55
36. Western, J.S., and Doube, L. (1979). Stress and Cyclone Tracy. In Natural Hazards Management in North Australia, ed, Pickup, G., Canberra, Australian National University.
37. McFarlane, A.C. (1983) The Ash Wednesday Fires: Effects on Children. Paper presented at the Annual Conference of the Royal Australian and New Zealand College of Psychiatrists, Adelaide, October.
38. Fried, M. (1982). Residential attachment: Sources of residential and community satisfaction. Journal of Social Issues, Vol. 38, No. 3, pp. 107-119.
39. Tucker, M.B. (1982). Social support and coping: Applications for the study of female drug abuse. The Society for the Psychological Study of Social Issues, Vol. 38, No.2, pp. 117-137.
40. Bolin, R. (1982). Long-term family recovery from disaster: Institute of Behavioural Science. University of Colorado.
41. Terr, L. (1979). Children of Chowchilla: A study of psychic trauma. Psychoanalytic Study of the Child, 34:547-623.
42. Bartrop, R.W., Lazarus, L., Luckhurst, E., Kiloh, L.G., and Penny, R. (1977). Depressed lymphocyte function after bereavement. Lancet (16 April): 834-36.

APPLICATIONS OF RESEARCH TO DISASTER PLANNING

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1. THE FIRE

The disaster of February 16, 1983, more commonly termed the Ash Wednesday bushfires, highlighted the threat which is ever present during the summer months in South Australia. History has shown that bushfires occur regularly in South Australia and appear to be part of the natural environment. The Ash Wednesday bushfires of 1983 have clearly shown that uncontrolled fires in zones of habitation have serious consequences. These are, loss of life, injury, material and financial loss, social distress, and damage to the environment.

The cost to both the community in general and individuals is high.

The 1983 disaster claimed 28 lives and resulted in injuries to more than 1 500 people, 85 of whom were hospitalised because of the severity of their injuries. More than 300 homes were destroyed or damaged, some 560 vehicles were destroyed and sheep and cattle losses exceeded 250,000. Nearly 1 000 rural properties were affected by the fires and 10 000 kilometres of fencing destroyed. The Woods and Forest Department lost approximately 1/4 of its commercial forests and major losses of national parks and wildlife reserves were sustained. An estimate of property losses is difficult to make but one authoritative estimate places the figure at over \$200m.

The residential development of the Adelaide Hills has produced a potentially dangerous situation for those who live in the semi-rural environment. Residents in the Hills are moving into, or are currently occupying, areas which are extremely vulnerable to destruction by fire. Due to the lack of understanding of the nature of the environment, people are inadvertently increasing the damage done by bushfires. Planning and development practices still allow sub-divisions and structures to be developed without sufficient fire protection measures, and accumulation of natural vegetation in residential areas continues to constitute a hazard.

The potential for uncontrolled fires on occasions of extremely dangerous fire conditions puts considerable strain on fire control organisations, control planning, control procedures and management of resources. In situations of extreme fire risk fires develop quickly and soon become uncontrollable. Adverse weather conditions could render fire spotting and fire fighting measures vitrually ineffective. On Ash Wednesday, 1983, South Australians were shocked by the fierceness and

tragedy of the bushfires which ravaged the Clare Valley, the Lower South East and the Adelaide Hills from Gumeracha to Meadows.

2. THE WELFARE DISASTER PLAN FOR 16 FEBRUARY, 1983

At 8.50 am on the 16th February, 1983, as a precautionary measure against the extreme weather conditions forecast for the day, the Executive Officer of the State Disaster Plan - Welfare, activated a Bushfire Alert.

The Alert is part of the Department of Community Welfare's warning procedures built into the welfare plan. The creation of an Alert advises people in the welfare organisation of the increased disaster potential, and requires them to be readily available during the Alert period.

At 2.30 pm as a result of the deteriorating conditions and the reported outbreaks of several major fires, the Department escalated the warning procedures to the "stand-by" phase. At 3.00 pm the various voluntary and Government Agencies participating in the plan were asked to report to the State Control Centre, Welfare, for further briefing. Those agencies were, Department for Social Security, South Australian Health Commission, Salvation Army, Red Cross Society, Society of St Vincent de Paul, Guide Association, Scout Association, Rotary International, Lions Clubs, Heads of Churches Organisation, and Seventh Day Adventist Church.

From 3.30 pm onwards and prior to the declaration of the disaster by the Governor at 5.15pm the State Controller Welfare authorised the establishment of a number of Welfare Assembly Centres in the fire affected areas. These centres were the focal point and initial contact for the delivery of welfare services to disaster victims.

All participating welfare agencies responded quickly and were active in field operations within two hours.

It became apparent early that the welfare problems caused by the fires were likely to be extensive and long term, requiring special measures to resolve them. The eventual solutions to these problems reflected the flexibility and co-operative nature of the disaster management approach in the State.

The Department sought, and Cabinet approved twenty Bushfire Relief Workers' positions. The workers would be responsible for providing victims of the fires with a service directed towards reducing delays, providing up to date and authoritative information, personal counselling, and the provision of services beyond the normal capacity of Department for Community Welfare staff in the affected areas.

In order to administer the large amounts of donated monies and gifts in kind given to alleviate the hardships of the victims, the Premier established a Bushfire Relief Advisory

Committee with its main operational group being known as the Bushfire Relief Unit which was based within the Department for Community Welfare.

Subsequently a review of the welfare response was made using internal and external sources. It was the conclusion of the review team that the welfare disaster plan worked well, however, the operational experience gained highlighted areas where refinements could be made.

3. STATE OF EMERGENCY

At 5.15 pm a State of Disaster was declared by the Governor on the advice of the Acting Premier. The declaration gave the Police Commissioner the power to direct State Government departments and other organisations to attempt to reduce the impact of the fires.

4. ESTABLISHMENT OF THE BUSHFIRE RELIEF UNIT AND COMMITTEES

The South Australian Cabinet met at 8.00 am on 17 February, 1983, and decided to channel contributions from the funds collected by Channel 9 and the Lord Mayor into a common pool. The money was placed in the trust fund set up at Treasury for Distribution was on the advice of a Bushfire Relief Advisory Committee which included representatives of the funds.

The Prime Minister had already advised that tax deductibility would be available on private contributions.

Cabinet at that meeting had also agreed that the Department for Community Welfare would provide facilities to disperse both official and private funds for bushfire relief. Barry Grear of the Ministry of Education was seconded as the Executive Officer and acted as Chairman of the Bushfire Relief Advisory Committee. It was agreed that the Bushfire Relief Advisory Committee would administer government assistance to those in welfare circumstances on the same basis as used in previous disasters with the figures updated according to inflationary increases. The first meeting of the committee under Mr Grear's chairmanship was immediately held. The following decisions were made:

- a. immediate relief would be made available through the Department of Community Welfare Centres and this would, as usual, be available to all affected by the fires. Relief would normally cover food, clothing and cash to carry on for a week. There would also be small emergency repairs to houses and accommodation costs for a few days.
- b. at this early stage it was noted that there would be difficulties with the Commonwealth Guidelines for assistance in relation to whether whole houses could be rebuilt by a grant in cases where people were disadvantaged. The question of assisting owners of houses, or

(without enquiry as to their comparative financial situations), to help in urgent needs. They did not see private money being used as replacement of public assets but rather as a human response to distressed people and it could for instance, be used to buy toys for children. Indeed some money had come from children.

5. FLOOD

Two weeks later on Wednesday evening the 2nd of March, 1983, the Barossa Valley, Gawler, Clare and some Adelaide suburbs were flooded by a once in 200 years rainfall. No lives were lost but hundreds of properties including a large aged persons home at Nuriootpa were damaged. The Bushfire Relief Unit then became the Bushfire and Flood Relief Unit.

6. SETTLING DOWN TO A PATTERN

In the immediate few weeks after the disasters considerable effort was expended in identifying the needs and wishes of the victims and local committees in the principal disaster areas by the attendance of Mr Grear as speaker at public meetings. The Bushfire and Flood Relief Advisory Committee was now meeting weekly to oversee the administrative arrangements. This Committee included senior officers from Treasury, Agriculture, Community Welfare, Housing Trust, Premiers and Local Government Departments and was chaired by Mr Grear.

A further group of people representing the media, charitable bodies, church groups, appeal fund organisers and the police met regularly to consider proposals for the disbursement of funds. Financial aid varied depending on the level of losses and needs.

7. ADMINISTRATIVE ASPECTS OF RELIEF ARRANGEMENTS

In administering the funds a target was set to distribute the majority of the funds within 6 months of the fire, that was 16th August, 1983. This target was virtually achieved, however, funds did continue to be received long after that date. The operation was achieved efficiently and harmoniously with a small administrative staff and virtually no adverse reactions from the victims or the media.

Weekly meetings of the committees were held until late March, then fortnightly until early May. Then as required.

Formal schedules of payments were authorised by the Minister of Community Welfare acting on behalf of the Premier.

8. TYPES OF GRANTS

- a. Immediate Financial Aid - \$250 per adult and \$50 per child as explained above.

- b. Disestablishment - \$1 500 was granted to those forced to find alternative accommodation due to the bushfire. External verification of residence completely destroyed or substantially damaged was sought from Police, the Insurance Council of Australia, Local Government or Bushfire Relief Workers prior to payment.
- c. Grief - Payments were made according to the existence of a surviving spouse, dependent children, and other persons living with the deceased at the time. The method of calculating grief grants, however, was carefully shielded from recipients so that the human life was not seen to be equated to the monetary values.

Special trust accounts were initiated through the Public Trustee for the children of those killed. Initial setting up costs will be more than covered by accruing interest. In two unusual cases, trusts for \$40,000 were approved, but withheld pending the birth of children whose fathers were killed in the bushfires.

This attracted quite positive front page media attention in South Australia and was also reported interstate.

All grief grants were personally delivered by the Executive Officer together with a letter of condolence from the Premier.

- d. Disfigurement - Surgeons who treated the more serious burns cases were individually interviewed, and their opinions sought as to the likely long-term cosmetic and mobility effects for each victim. The surgeons subjectively rated their own patients, using a simple common scale of severity from 1 to 5 which was used by the Bushfire Relief Advisory Committee (BRAC) as a guide to determine the amount of each grant.

In cases where victims were not covered by a workers' compensation scheme (eg Volunteer Fire Fighters' Fund or CFS Fund), the calculated grant (maximum \$40 000) was doubled in an endeavour to equalise financial relief.

- e. Tool Libraries - Each Council in an affected bushfire area was contacted very soon after the disaster, and advised that they would be funded up to \$1 000 for the purchase of tools. The purpose of the government grant was to provide local victims in each Council area with tools necessary to commence private clearing operations.

The Councils were authorised to purchase the equipment and invoice the government, through the Department for Community Welfare, direct. Ultimately, it was envisaged that the tools would become Council property.

It was surprising to note that several councils did not take up the offer.

- f. Funeral - Grants were not necessarily paid to next of kin in a conscious attempt to avoid potential legal entanglements with estates. Instead, up to \$1 000 was paid to any person who was handling the funeral arrangements for an individual killed in the "Ash Wednesday" bushfires (one payment per fatality).
- g. Property - Grants were paid as portion of the total net loss.
- h. Flood - Similar administrative arrangements were made for the flood, however, because of the availability of funds totalling approximately \$250 000 the property loss payments were very small. The flood appeal, initiated by the Chairman of the Angaston Council, was managed by a flood relief committee with representatives from local council, media and church groups. This was also chaired by Mr Grear. That committee completed its work by the end of August, 1983.

9. CASH FLOW

April 83	Receipts approx.	\$7.8m	Expend. approx	\$1.8m
June 83	"	\$11.0m	"	\$6.9m
August 83	"	\$11.5m	"	\$10.9m
October 83	"	\$11.7m	"	\$11.8m
December 83	"	\$11.8m	"	\$11.8m
February 84	"	\$11.8m	"	\$11.8m

10. CONTACT WITH THE BUSHFIRE RELIEF WORKERS

The Bushfire Relief Worker operation was one of the significant successes of the task.

The work done fell into three main phases. For the first fortnight, most activity was still immediate practical help for victims not coming to grips with their losses. Food was still being provided, along with emergency housing, clothing and initial pay-outs from the funds, such as the \$1,000 grant for funeral costs. Workers during this stage also began systematically to follow up all victims, some 2 000, many of whom refused to leave their properties or to register for assistance.

From early April till late May, workers began to handle the thousands of enquiries about payments from the funds and insurance issues, as victims began to organise their affairs. They also played an important role in assisting local service organisations to mount such exercises as cleaning up burnt buildings, and re-fencing by hundreds of volunteers. A number of local committees developed, some producing regular newsletters, and the relief workers attended dozens of public meetings to give information and advice.

The final phase, which concluded in August 1983, involved the last details of payments from the funds, and longer term counselling for victims with major unresolved personal problems. From the initial 2 000 contacts, only about 50 remained as clients of normal Department for Community Welfare services after the middle of August.

11. RESEARCH NEEDED

The basic criteria for all areas of disaster planning is simplicity. That is important because it is not known who will be involved when a disaster occurs. All plans and follow-up administration, therefore, needs to be easily understood, easily implemented and easily changed to suit the particular situation.

After a disaster the personal needs of persons affected by the disaster are paramount.

If the disaster is widespread then it is necessary to ensure that individual situations are not lost because of decision making in one area being applied less sensitively in another.

12. PARTICULAR PROBLEMS NEEDING RESEARCH

- (1) How much information needs to be collected about victims in the immediate few hours?

The role of the Bushfire Relief Workers was "to ascertain the personal needs of those individuals and families and make sure they are not suffering undue hardship while applications are being assessed by the Bushfire Relief Unit".

For most people, the completion of forms proved to be an arduous and time consuming task. It brought home the enormity of their financial loss and the daunting task of reconstruction which lay before them.

Police had interviewed people followed closely by Agriculture, RSPCA, insurance/banks as well as the relief funds.

- (2) How widely does the effect of disaster reach out into the community?

In the weeks immediately following the Ash Wednesday bushfires, staff in district offices of the Community Welfare Department reported a considerable increase in requests for assistance with a wide range of problems seemingly unrelated to the bushfires. This phenomenon was reported by workers over a wide area of the State including districts unaffected by the fires.

It could be hypothesised that, as a result of the bush fires, community anxiety had risen to a level at which many members found their problems no longer bearable. If this is the case there are important consequences for future planning in regard to normal community services.

- (3) What are the skills and experience needed by front line post disaster workers?

The kind of skills and experience are:

- . training in grief counselling
- . knowledge of the geography and social fabric of a community
- . knowledge of Government Departments and community organisations
- . experience and skills in working with people in need
- . ability to work with very limited supervision
- . initiative, flexibility and a high energy level

- (4) Can training programmes be defined for post disaster workers?

Many community groups were involved in post disaster support, however, they were not always sensitive to the needs of the victims. In country areas the key Government representatives tend to be quite mobile and familiarisation with the geographic and social structure of the community needs to be regularly updated and available to post disaster workers.

- (5) What structure is needed for local community representation on pre-disaster planning and post disaster management?

Many government agencies and community groups consider that they have specific roles. These need clarifying and understanding by each other.

- (6) How can community awareness of potential disaster area development be highlighted and the awareness maintained?

In South Australia the State Government Insurance Commission and others have spent hundreds of thousands of dollars on such campaigns, however, the assessment is that they have been of little value.

- (7) In the matter of integrated training for all emergency service personnel, what would be the optimum periods between practices for leaders and members?

There was evidence that those areas who had recent practices performed better in the fires.

- (8) Leadership in the evacuation of people prior to, during and after the disaster was significant in the post disaster concerns. Who are the appropriate leaders and who helps the community to put their trust in them?

- (9) What are appropriate penalties for arson?

This was another matter which caused concern in the community after the fires.

- (10) Is it appropriate to have a standing appeals committee with possibility of carry-over funds?

This matter was discussed widely from about month 6 to 9 after the fires but has now become a lost issue.

- (11) The loss of personal affects was traumatic for many people. Should the community be encouraged to put photographs, heirlooms, etc. into safe deposits?

- (12) Should information about post disaster trauma be part of inservice training for school leavers?

- (13) The rural community was concerned about the assessment, destruction and disposal of burnt stock. Should the plans for these activities be available in brochure form to all primary producers?

- (14) The rationalisation/standardisation of fire fighting equipment could reduce costs and increase availability and usefulness. Who should initiate moves Australia wide for such direction?

- (15) The lack of knowledge by owners about their insurance policies was a problem. Should there be uniformity in the presentation of insurance data?

- (16) What are the key equity issues in the distribution of appeal funds?

Appeal funds favour victims who suffer from the sensational disasters like Ash Wednesday but do little for victims of equally harsh personal disaster which is not as sensational, eg the Barossa floods two weeks later.

- (17) How long before the community would respond with financial donations in the same way again?
- (18) What has been the economic impact on the community as a result of the fires?
- (19) What is the stress on the helpers?

What are the best methods of debriefing? I know that I have personally gone through a period of needing a psychological debriefing for myself.

- (20) To whom should people be referred for counselling and in-depth help?

13. ACKNOWLEDGEMENTS

I am grateful for the members of the Bushfire Relief Unit and the Director-General of the Department for Community Welfare who through their support, encouragement and forgiveness allowed me to undertake the tasks.

Special recognition needs to be given to Mr Kevin Drummond who acted as my Deputy throughout the task.

ETHICAL ASPECTS OF DISASTER RESEARCH

by

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Introduction

I was somewhat surprised when I was given this topic to speak on by Dr Sandy McFarlane because the issue of ethical aspects of disaster research is not one that is commonly considered. I think it is a reflection of the state of the art in this area firstly, to be having a conference such as this at the Australian Counter Disaster College and secondly, that a topic such as ethical issues in disaster research is being addressed. It is my experience that the state of knowledge in an area has to reach a certain point before issues of ethics are seriously considered. In the beginning of the development of a new field of study, workers do various pieces of research building up a picture of the field until the point is reached when the 'gestalt' of the field can be seen, and only then does an interest in the more subtle aspects of a field develop such as aspects of the ethical considerations in such research.

Ethical issues in disaster research have particular importance because the research is being done on people who have neither assumed the role of patients nor are likely to do so. The importance of the study of human behaviour during and following disasters is well known. It can provide valuable insights into the psychology of coping particularly in extreme environmental circumstances and provides clues about the etiology of psychiatric disorder. The nature of the crisis however, the extent of the personal distress and the helplessness of individuals affected, make those afflicted by disaster a particularly vulnerable group, whose distress may be increased by the researcher.

Recent Interest in Psychiatric Ethics

The reasons for an increased interest in ethical issues in Psychiatry in general, and in psychiatric research in particular have been well summarised by Bloch and Chodoff in their recently published book 'Psychiatric Ethics'. They summarised the factors contributing as being the following. Firstly, the medical consumer movement has in recent years come to constitute a potent and more or less coherent social force. The physician and other members of the helping professions no longer compel blind reverence nor is there unquestioning compliance with their methods. There is a much more general sceptical attitude towards authority. Secondly, an increased interest in ethics

has been associated with vehement repeated attacks on all professionals by what might be broadly termed the civil libertarians. Thirdly, the treatment and research of the mentally distressed has traditionally conjured up the image of manipulator and helpless victim, particularly in situations where because of acute distress or psychosis the patient is unable to provide informed consent. Fourthly, there has been increasing dialogue between the medical disciplines particularly psychiatry and other professional disciplines such as sociology and philosophy and fifthly, it has been becoming increasingly apparent that psychiatry has been abused in various countries particularly the Soviet Union.

Two Ethical Positions

The word ethics is derived from the Greek adjective *ethikos*, from *ethos* meaning 'nature' or 'disposition' and is commonly used in one of two ways which we can refer to as the philosophical and the practical. In tackling the questions of what constitutes ethical behaviour and how values are derived, the moral philosopher constructs a conceptual model or theory. The two most simple theories can be contrasted as the 'utilitarian approach' and the 'absolutist approach'. The utilitarian position has been much influenced by John Stuart Mill. Here the emphasis is on the consequence of acts, on the balance between good and bad consequences between benefits and harms. A person's action should be chosen so that it produces the best result by recognizing the needs of all those persons who will be affected by that action. The final consequences will be the greatest possible happiness of all concerned. The competing position which is the absolutist, has as its core thesis that certain acts are intrinsically wrong regardless of their consequences, can never be made right and that moral judgements have universal applicability; for example, an act like the murder of an innocent person or the theft of another person's property are judged in the absolutist approach to be totally wrong. In a similar vein the notion that research subjects must always be able to give totally informed consent is an absolutist's view point.

Ethical Principles in Psychiatric Research

John Wing in his chapter entitled 'Ethics and Psychiatric Research' in the previously mentioned book on Psychiatric Ethics has summarised three general principles that he feels have to be dealt with in all psychiatric research. They are firstly, the balance of good and harm, secondly, informed consent and thirdly, confidentiality. The balance of good and harm or the principle of least harm, has as its central ethical principle that the doctor must not knowingly act against the interest of his patient and must take all reasonable steps to ensure that he does not do so unwittingly. The vast majority of research projects do not involve any probability of serious harm coming to those involved but even studies where there is little or no risk to the patient do require reconsideration of the balance

of good versus harm.

The notion of informed consent, involves the general rule that people chosen to participate in research projects should be told frankly what the risk and benefits are likely to be and what the purpose of the research is. There are however many difficulties in the way of achieving completely informed consent. First it is impossible for the clinician to tell the patient everything in his mind. Secondly, the patient can only rarely be as well informed as the clinician and thirdly, even if it were feasible to spend a very long time with each patient it would often be undesirable to do so on ethical grounds since the patient might well receive the impression that the clinician was unwilling to take responsibility. The particular problem of consent by people whose judgement is impaired or not free must be raised. In many psychiatric situations an attempt is made to get around this by obtaining consents from relatives or guardians. The difficulty that individuals who are in states of great distress have in making rational decisions in regards to giving consent is one that must always be in the mind of the disaster researcher.

Confidentiality is a basic ethical principle in research that the doctor should take all reasonable precautions to preserve the confidentiality of the information given to him by patients. However, in today's world it is no longer practicable to look upon the single health-care giver as the patient's sole confidant in any serious illness and it is assumed by public and professionals alike that any contact with the complex helping professions today implies acquiescence in some degree of confidence extended to the team.

What do Disaster Researchers Need to Know Before Embarking on a Project

There is no doubt that disasters fascinate people. It is also well recognised as there is a convergence phenomenon both from the public and helping agents at the time of disaster. The motivations of such fascinations and involvement range from the altruistic fully conscious motivations to much more complex unconscious motivations. We from the Mental Health Professions need to be constantly alert to our possible biases. We may very much need to find psychopathology in the victims. We may let our own 'survivor guilt' influence our perceptions. I would hate to think that we were as cynical as the Professor of Community Medicine at Newcastle who has said that 'clinical epidemiology is the science of turning death certificates into plane tickets'. There is no doubt however that many of us may be attempting to improve our curriculum vitae rather than have genuine concerns for the victims of the disaster.

I believe that disaster researchers need to know some basic principles before they embark on research in human behaviour in disasters. In particular I believe they need to know what is already known about the psychology of disaster victims. They need to have a good understanding of concepts of stress and crisis and how these are modified. They need to know that crises are crucial periods in a persons's life and that interventions both therapeutic and non-therapeutic can have a profound effect at times of crises. Workers in addition need to know the concepts of loss, mourning and grieving. All disaster victims experience various degrees of loss, the most serious of course being the loss of a loved one. The mourning and grieving of these losses are complicated by the chaotic aftermath. Even in disasters which do not involve deaths there will be losses of home, mementoes, neighborhood and income. Thirdly, I think that it is important that disaster researchers know about social and emotional resources and how individuals utilize such resources. They need to know about coping and adaptation strategies behaviours that protect the individual from internal and external stresses and finally, they need to know about the attribution theory, ie the way individuals make sense of events that have happened to them. It is very important that researchers know the stage individuals go through following a disaster, because they are going to be asking questions whether by questionnaire or by interview that may have the effect of opening up old wounds. Researchers need to be experienced in dealing with such responses. I know, for example, that in John Clayer's study in South Australia a number of people have been affected by merely receiving a follow-up questionnaire.

Particular Ethical Issues for Disaster Research

One particular important issue for disaster researchers is the timing of their research. There are ethical issues in attempting to look at individuals in the immediate post-disaster phase when distress is greatest as against intermediate and longer term follow-up. Each has particular issues and these need to be thought through.

In any disaster research the question of sanctions from relevant other authorities and co-ordination of the research with the services that might be being offered needs to be considered. As part of the convergence phenomenon following disasters victims often do not know who is talking to them. We know that mental health workers have only grudgingly been recently accepted into helping teams and researchers are generally even less welcome. It is important that researchers have clear goals and use the most appropriate methodology to answer the questions posed. A particular issue of research with helpers is to be aware of the need of helpers not to know about their own limitations and the wish they may have to appear strong. The most critical issue for the research worker is to believe in what he is doing and to have achieved some validation of his methodology by sharing his ideas with critical others.

Conclusion

I have briefly dealt here with some of the ethical issues for disaster researchers. There are a number of documents which provide guidelines for example, those of the NH&MRC and Declaration of Helsinki which are important for all researchers to be aware of (Appendix 1). I believe that it is very important to continue to research human behaviour in disaster but that we do this in a unified and co-ordinated way and that the needs of unbiased research must be balanced against care and consideration of those who have suffered horrific experiences.

References

Psychiatric Ethics. 1981. Ed. by S Bloch and P Chodoff, Oxford University Press.

Handbook for Mental Health Care of Disaster Victims by R E Cohen and F L Ahearn, 1980. The Johns Hopkins University Press, Baltimore.

F Redlich and R F Mollica. 1976. Overview: Ethical Issues in Contemporary Psychiatry. The American Journal of Psychiatry, 133:2 February, pp 125-136.

Basic Principles of Declaration of Helsinki are reproduced below:

1. Medical progress is based on research which ultimately must rest in part on experimentation involving human subjects.
2. In the field of biomedical research a fundamental distinction must be recognized between medical research in which the aim is essentially diagnostic or therapeutic for a patient, and medical research, the essential object of which is purely scientific and without direct diagnostic or therapeutic value to the person subjected to the research.
3. Biomedical research involving human subjects must conform to generally accepted scientific principles and should be based on adequately performed laboratory and animal experimentation and on a thorough knowledge of the scientific literature.
4. The design and performance of each experimental procedure involving human subjects should be clearly formulated in an experimental protocol which should be transmitted to a specially appointed independent committee for consideration, comment and guidance.
5. Biomedical research involving human subjects cannot legitimately be carried out unless the importance of the objective is in proportion to the inherent risk to the subject.
6. The right of the research subject to safeguard his or her integrity must always be respected. Every precaution should be taken to study the privacy of the subject and to minimize the impact of the study on the subject's physical and mental integrity and on the personality of the subject.
7. Doctors should abstain from engaging in research projects involving human subjects unless they are satisfied that the hazards involved are believed to be predictable. Doctors should cease any investigation if the hazards are found to outweigh the potential benefits.
8. In publication of the results of his or her research, the doctor is obliged to preserve the accuracy of the results. Reports of experimentation not in accordance with the principles laid down in this Declaration should not be accepted for publication.
9. In case of legal incompetence, informed consent should be obtained from the legal guardian in accordance with national legislation. Where physical or mental incapacity makes it impossible to obtain informed consent, or when the subject is a minor, permission from the responsible relative replaces that of the subject in accordance with national legislation.

PSYCHIATRIC DISORDER IN PRIMARY SCHOOL CHILDREN FOLLOWING A
NATURAL DISASTER

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INTRODUCTION

Children attracted particular attention after the Ash Wednesday fires in South Australia. They were the focus of concern of many community groups, parents and health professionals because of the magnitude of the distress they experienced, in the context of their developmental vulnerability. The fires commenced at the time most children were at school, so that many were separated from their parents at the time the fires passed. Others were exposed to a major threat when they were on school buses in the fire affected areas at the time the fires were at their height. There are also a number of indirect stresses for these children. Apart from their parents' own preoccupation with their exposure to the fires, in the early days after the event the parents were busy attempting to cope with the practical and psychological dilemmas associated with their losses. Similarly, a number of long term stresses such as relocation and the prolonged effects of reconstruction will have had an impact on this population.

Despite the face validity of these concerns, there is continuing controversy about the impact of disasters on the victims including children and some investigators deny that serious psychological effects occur. Ziv and Israeli for example studied the children from seven kibbutzim which had sustained frequent enemy shelling over a lengthy period and contrary to expectation found no significant differences of anxiety symptoms on these kibbutzim when compared with non bombarded ones. This research had concentrated on the immediate impact phase of a stressful event. A study (Burke) which had both a before and after measure of a group of children, found that five months after a severe winter storm, the levels of behavioural disturbance in a group of primary school children were not significantly increased although certain sub-groups were identified to be adversely affected by their experience. Burke and others have noted that even the best studies looking at the effects of disasters on children have relied on general opinion surveys of observers or parents and that often after natural disasters parents deny that their children have problems. They confirm the presence of parental denial in their study. This indicates the importance of reliable and even multiple measures of distress in children. Milne, studying the effects of Cyclone Tracy on Darwin children, found that the longer term effects were particularly noticeable in the children of families that had been evacuated and had not returned. Such studies have depended on measures of symptomatic distress. The clinical relevance of these findings has been difficult to establish. Terr who has conducted a four year follow up on 25 school children kidnapped at Chowchilla has indicated the importance of looking at the developmental effects of being exposed to a disaster rather than simply focusing on symptoms.

She has found that these children demonstrated continued preoccupation with the traumatic event, emotional constriction and a negative perception of the future in themselves and that their restricted developmental horizons were due to their inability to come to terms with their trauma experience. Newman has demonstrated similar emotional impairment amongst the children who survived the Buffalo Creek disaster which included an increased sense of vulnerability to future stresses and an altered sense of power of the self. Again the clinical relevance of this data is difficult to ascertain. No systematic research has been conducted attempting to define caseness using a standard measure although Bloch et al attempted to categorise the severity of the emotional reaction in a group of children exposed to a tornado. These workers also attempted to elicit what were the disaster related events that had the greatest impact on the children. Their research suggest that the childrens' reactions must be understood within the context of their family and that in the early phases of disaster their reactions are a function of the way in which reality filters down to them and so mirrors their parents' reactions rather than relating directly to the event. The general conclusion is that children rarely need specialist psychiatric treatment but they do benefit from an opportunity to ventilate their anxieties to a sympathetic adult (Kinston & Rosser). Teachers are another group that are likely to have an important impact on a child's sense of safety and the longer term acceptance of a disaster although this has not been investigated. In summary, research has indicated those most at risk are between the ages of 8 and 12, have a previous history of physical emotional illness and come from unstable homes.

Based on this knowledge it seemed that any future research should incorporate a longitudinal design that included some measure of parental adaptation. Similarly, the instrument used for measuring psychiatric disorder in children should be well validated and be able to define likely psychiatric cases. The need to examine a large population so as to make some assessment of risk and prevalence also seemed important priorities.

AIMS

The aims of the study were:-

1. To describe and document psychological morbidity of children between the ages of 7 and 12 secondary to the Ash Wednesday bushfires.
2. To determine what aspects of the children's experience was particularly harmful and to examine the role that subsequent events played in the maintenance and mitigation of their distress.

In South Australia there were three main areas affected by the bushfires - the Adelaide hills, the Clare Valley district and the south east of the State. The primary schools in the south east were chosen for study for several reasons. Firstly, the population affected by the fire was easily defined geographically unlike the Adelaide hills population, where many children attend school in the city. Secondly, the Child, Adolescent and Family Health Services had recently established a psychiatric service for children in the south east of the State and had established contact with the schools in the first days after the fire. They had provided information about the expected reactions of children and the availability of clinical services if they were required. Ms Sandy Policansky and Dr Claire Irwin the Director of the Service assisted in setting up the research project. It was reasonable to speculate that the impact of these fires on the south eastern community was substantial. The intensity of the fire was extreme, flames 800 feet high having been photographed. At some points of the fire the wind was strong enough to snap mature pine trees half way up their trunks. Fourteen people died in the fire and 40 homes were destroyed. 359 properties were partially or fully burnt and 120,000 hectares of agricultural, pastoral and forest land were laid waste. The extent of the devastation by the fire in this region was in fact greater than in the Adelaide hills.

Seven primary schools were chosen for study. One declined to be involved. One school, Penola lay outside the fire affected area, although a number of the children attending the school came from the area that had been burnt out. The staff at this school were reluctant to participate and had to be paid to fill in the first stage questionnaires. Thus the co-operation of the schools of the periphery of the fire was less than those in the fire affected areas. Although this research was conducted under the auspices of a clinical service, in the initial stages the general impression was given that there were few or no problems that required investigation. The following hypotheses were to be examined.

1. The prevalence of cases would be:
 - a. Greater than the comparable rural population.
 - b. Decrease with time after the disaster.
 - c. Proportional to the exposure and losses experienced by the child and his/her family.
2. Parental or family distress and other factors which may change and disrupt the parent child relationship would be associated with high levels of morbidity.
3. Psychiatric disorder would be an important source of absenteeism from school.
4. Teachers accurate perception of children's distress would be a protective factor.

METHODOLOGY

The population was studied two and eight months after the fire. Rutter's Parent and Teacher questionnaires were chosen as the dependent variables. The advantages were that two independent ratings would be obtained on each child and that the instrument could both be scored as a linear scale and a measure of caseness. Lack of resources meant that as has been the case in the majority of other studies using these instruments, it was not possible to interview those children scoring in the pathological range. As well as filling in the Rutter's scale, the parents were asked to document the personal and property losses of the family as well as the experience of the child and themselves on Ash Wednesday. Several questions were also asked about the immediate impact of the disaster on the family's functioning. The Parents' Questionnaire for the second stage of the study was designed to measure the continuing impact of the disaster on the families. This included the resolution of grief about the losses, whether the parents had recurring thoughts and feelings about the fire, and the extent of reconstruction. An eleven item scale was designed to measure family functioning, focusing on the types of disorder that could be anticipated in post traumatic syndromes.

A preliminary analysis of the data from the first stage of the study suggests several modifications were necessary to the methodology in the second stage. Firstly, the inverse correlation between age and the number of symptoms suggested that younger children should be included. The study was therefore extended to include preparatory students as well as grades 1 and 2. When analysing the individual teacher's responses in stage 1, a wide variation in the number of symptoms reported in their classes was noted. Some teachers had not reported a single symptom in 30 pupils. It seemed that attempting to identify some of the variables that influence teachers reporting behaviour would allow the development of some understanding into the denial of children's distress by adults in a disaster setting. The individual teachers were interviewed under the guise of collecting information about children in their classes who were high scorers on the parents' scale or parents had not responded on the first occasion. Some extra items were also added to the parent and teacher questionnaires for the second stage that covered behaviours reported by the teachers as being typical of a continued preoccupation of the fire.

The return rate obtained at stage 1 was much lower than in most studies that have used Rutter's instruments. For this reason I decided to attempt to recontact those parents who failed to respond in stage 1. This required developing a third questionnaire that represented a condensation of the stage 1 and stage 2 questionnaires. The same questionnaire was given to the parents of the younger children.

Finally the comparison between the stage 1 data and a control group of school children in rural Queensland (Connell) raised a number of questions about the adequacy of this control. For this reason a control group study has been set up in a neighbouring

district of the south east of South Australia. In June 1984 700 children in two Naracoorte primary schools are going to be surveyed using Rutter's instruments.

RESULTS

The total number of children examined in this study was 809. The original sample was 520. On that occasion a response rate of 45.2% was obtained from the parents. I depended upon teachers to ensure an adequate response rate and did not recircularise the parents. In the second stage of the study a parent response rate of 57.7% was obtained. In the interim I had sent the parents a copy of the preliminary results of stage 1 and then sent them three reminder letters to attempt to improve the return rate. On both occasions the teacher response rate was approximately 88%. Thus two groups existed for data analysis. The first included those children whose parents had responded at time 1 and the second group were the children whose parents did not respond at time 1 but did at time 2. Only the data from the teachers questionnaires will be presented. This represents the lowest denominator of disorder and suggests that the level of problems may be substantially underestimated because of the relative insensitivity of teachers to psychiatric symptoms in their pupils. On the other hand, it avoids the possibility of attribution by parents by the knowledge of the child's exposure and minimises the impact that their own mental state may have on their reporting of symptoms in children.

The age of the subjects included in the study ranged from 4 to 13 with the mean being 8.1 years and 52% of the subjects were males. The distribution across the eight primary grades was fairly equal. The mean number of children per family was 2.9 and only 5.7% came from single parent families.

Examining the exposure of the children on Ash Wednesday 43% of those children threatened by the fire were with their parents at the time the fire passed and 28.9% were on a school bus. The level of the personal threat experienced by their parents was substantial, 25.1% of the fathers coming close to injury. Approximately a quarter of the families were split up in the first three days after the disaster. 27.4% of the families had a friend or relative killed or injured seriously on Ash Wednesday and 31.9% had had some form of property loss. Thus on all accounts, the impact of the disaster on these children's families had been substantial.

Looking at the range of scores on the Teacher's scale only 2.7% of children scored in the range of a psychiatric case which compared with 10% in the rural population in Queensland. Thus the levels of morbidity were very much lower than predicted. There are a number of possible explanations for this observation.

1. It seems that in response to this major stress many children may in fact be better behaved and more compliant than usual. It seems that they are aware of the extent of the calamity and become more agreeable in this setting. Thus to a degree they internalised the experience.

2. It seems likely that the parent and teachers pre-occupations with their own losses and feelings in relation to the fire makes them less observant of their children. This notion is supported by the observations of Bloch in his interviews with parents in the early stages after a tornado.
3. There was a general reluctance within this community to acknowledge the fact that children may have experienced psychological pain as a result of the fires. They seemed to believe the myth that many children are too young to know what has really happened. Despite the considerable efforts put into establishing this research project, the relatively low return rate has to some degree been a measure of the denial about the psychological issues at a time when the practical tasks of reconstruction were immense.
4. It seems that a number of children had in fact somatised their reaction to the fire. Headaches were twice as prevalent in this community compared with controls. The relevance of this observation was highlighted by one teacher, who commented, on hearing the results of the study, that in his class of 17 children in the first six months of 1983 there were more absentees than in his entire class of 31 children in 1982. He commented that a large proportion of this indiscrete absence could be accounted for by headaches and stomach aches.

Doing a correlational analysis, the following factors were associated with a raised score on the teacher scale. Age had a negative correlation so the younger children were more distressed. Interestingly there was no correlation with property loss. The child's personal exposure was important $p = .04$ as was if the family was split up in the first three days after the fire ($p = .013$). At this stage, personal loss by the family ($p = .009$) or if the parent came close to injury ($p = .005$) were strong predictors on the teachers scale of psychiatric morbidity. Thus in the early stages after the fire, the level of exposure to the fire by both the child and their parent rather than the losses experience were the strongest predictors of psychiatric morbidity.

Looking at the findings of the eight month follow up, the continuing impact of the disaster was substantial. 40% of families reported that much work was still to be done and over a third still reported that their income was significantly affected. Nearly 80% of the parents had been unable to put their losses behind them and frequently felt pre-occupied by them. A further enquiry into the parents feelings and thoughts about the fire indicated that 8.8% were less able to cope than before and around 74% were reporting intrusive thoughts and feelings about the fire. In general approximately 45% were feeling more over-protective of their children. Although some families reported feeling closer after the fire, a significant number had felt their family relationships had come under strain.

Looking at the level of pre-occupation reported by parents and teachers by the children about the fire, 43% of children spontaneously continued to talk about the event and 35% were upset by

reminders according to the parents. The teachers' reports about pre-occupation with the fire were very much lower. These results, for example that only 3.2% of children were afraid of fire sirens, would seem to represent a substantial underestimate. When I was visiting a school to interview the teachers a fire siren was accidentally triggered. The whole of one teachers class burst into tears despite the fact that it was pouring with rain and there was clearly little chance of there being another fire.

Looking at the teachers scale, 8% of children were now scoring in the range of a psychiatric case and the mean score had doubled from the original survey. However, the level remained 2% below that in the control population. At this stage it was possible to ascertain how the parents who had only responded on the second occasion compared with the responders at time 1. The levels of property and personal loss were no different and similarly the level of disruption caused within the families by the disaster was similar. However, those who responded only the second occasion reported worrying more about harm coming to their children and reported more changes in their family. This suggests that these people may have been more prone to deny the distress of their children originally because they were under greater emotional stress themselves.

Using between group comparisons, it was possible to examine the continuing impact of a disaster at time 1 on the teachers scale at eight months. Boys scored significantly higher than girls. Excluding intrusive thoughts which corresponded with all measures, the strongest predictor of disorder seemed to be whether the parents came close to the injury. Property loss was also found to be significant on the neurotic scale although personal loss was not a predictor from the total score. Children on school buses tended to score lower. These findings tend to suggest that the practical nature of the events that occurred on Ash Wednesday were continuing to have some effect eight months later but this was only likely to account for a small percentage of the variance of the children's score.

Looking at correlations with the teachers scale at eight months, there was a negative correlation with age which was statistically significant at the level of P less than .001. On the total score changes to the family functioning were significantly correlated P less than .05 and it also seemed that the more senior the child was in the family the worse its outcome (P less than .05). The neurotic scale of the teachers instrument demonstrated stronger correlations, focusing again a continuing effect of property loss and the position of the child in the family and the changes in family functioning. These variables were highly significant at the level of P less than .001 on the Impact of Events Scale. This suggests that it is very difficult for a child to master his or her fears about a fire and to adapt to the future if his parents remain stressed by it. This does not necessarily mean that the 74 child will be symptomatic.

This data tends to support the relevance of focusing on the likely style, rather than simply focusing on symptomatic distress. On a simple correlation analysis it was found that the neurotic score on the teachers scale was a predictor of the number of days absent.

Examining the question of the number of days absent from school in more detail, 20% of children had missed more school in 1983. Comparing these children with other pupils on the Parent and Teacher Scale the difference is a statistically significant level of P is less than .000. This suggests that psychiatric morbidity is an important source of absenteeism in primary school children. As results have indicated, psychiatric morbidity has a significant but not overwhelming correlation with a number of disaster related experiences, suggesting that this is an important source of disruption to at least some children's developmental progression.

CONCLUSIONS

This study into the psychological impact of the Ash Wednesday fires on primary school children in South Australia indicates that there is a significant association between children's disaster related experiences and their psychological morbidity. These associations hold up even using the relatively insensitive measure of the Teachers Scale developed by Rutter. The following are also described:-

1. The levels of distress are greater at eight months than two months after the disaster. This is contrary to prediction and indicates that children's level of morbidity was rising at a time when the disaster related services are likely to be withdrawn.
2. The levels of morbidity are not statistically greater than in a controlled population and by no means represent an epidemic of disorder. This suggests that the significant majority of children survived the experience of a fire relatively free of symptoms. On the other hand the substantial presence of intrusive thoughts and feelings amongst these children, typical of post traumatic syndromes leaves many questions unanswered about the developmental impact of this experience on these children.
3. This study supports the finding from adult psychiatry that there is a link between adversity and symptoms but the association is not a powerful one. To explain psychiatric disorder, questions of individual vulnerability rather than environmental factors need to be explored. In this population of children, it seems that disturbed family functioning and parental distress following a disaster is the major vulnerability factor identified.

4. Psychiatric disorders in disaster affected populations often are missed because they presented physical symptoms. The high prevalence of headaches and stomach-aches was found at both stages of the study.
5. The levels of awareness amongst teachers at the time of disasters requires assessment as they may tend to isolate themselves from the experience of their pupils and parents.

Finally, because the prevalence of a major psychiatric disorder is relatively uncommon even after circumstances where the community has experienced extreme environmental stress, it is easy for these disorders to be ignored. The evidence would suggest that in at least some the psychological symptoms that are experienced are qualitatively and quantitatively different from the more ubiquitous non specific symptoms observed in disaster affected populations. Unless these two sorts of distress are separated, significant difficulties can be left untreated to the child's long term detriment. Personnel with specific mental health training are required to treat such a disorder.

The number of children requiring such treatment after a major disaster is likely to be numerically very small. On the other hand, it seems that many of these difficulties could be circumvented by attending to the psychological welfare of their parents. The evidence would suggest that a number of post traumatic disorders in disaster affected adults go unmissed despite their presentation general practitioners and welfare services. Programmes to improve the rate of diagnosis and to ensure the provision of early treatment would likely to be one of the most effective ways of minimising the effect of a disaster on children who have been exposed to the event.

REFERENCES

1. ZIV, A., and ISRAELI, R., (1972) Effects of Bombardment on the Manifest Anxiety Level of Children Living in Kibbutzim. *Journal of Consulting and Clinical Psychology*. 40, 287-291
2. BURKE, J.D., BORIS, J., BURNS, B.J., MILLSTEIN, D.H. and BEASLEY, M.C., (1982) Changes in Children's Behaviour After a Natural Disaster. *American Journal of Psychiatry* 139, 1010-1014
3. MILNE, G., (1977) Cyclone Tracy, : 11 The Effects on Darwin Children. *Australian Psychologist* 12, 55-62
4. NEWMAN, C.J., (1976) Children in Disaster: Clinical Observations at Buffalo Creek. *American Journal of Psychiatry* 133, 306-312
5. TERR, L.C.(1983) Chowchilla Revisited: The Effects of Psychic Trauma Four Years After a School-Bus Kidnapping. *American Journal of Psychiatry* 140, 1543-1550
6. BLOCH, D.A., SIBER, E. and PERRY, S.F. (1956) Some Factors in the Emotional Reaction of Children in Disasters. *American Journal of Psychiatry* 113, 416-422
7. KINSTON, W. and ROSSER, R., (1974) Disaster: Effects on Mental and Physical State. *Journal of Psychosomatic Research*, 18 437-456
8. THOMAS, A. and CHESS, S. (1984) Genesis and Evolution of Behavioural Disorders: From Infancy to Early Adult Life. *American Journal of Psychiatry*, 141 1-9.
9. RUTTER, M., TIZARD, J. and WHITMORE K. (1970) *Education, Health and Behaviour*. Longmans London.
10. CONNELL, H.M., IRVINE, L. and RODNEY, J. (1982) The Prevalence of Psychiatric Disorders in Rural School Children. *Australian and New Zealand Journal of Psychiatry* 16, 43-46.

THE EFFECTS OF BUSHFIRE DISASTERS ON FIREFIGHTERS AND THEIR FAMILIES.

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In recent years there has been an increase in carefully documented research into the long term psychological effects of disaster. However there are still only a few studies which have used a quantitative rather than a descriptive approach to the specification of the outcome and of the variables associated with the disaster. There is evidence that some impairment will be found in a percentage of survivors after at least a year or perhaps longer (Gleser, Green & Winget, 1981) but the extent to which findings can be generalised from one disaster to another is open to question.

Not all disasters produce the same amount of stress. There appear to be grounds for distinguishing between man-made and natural disasters (for example it is suggested that lack of damage contributed to chronic aspects of the Three Mile Island accident (Goldsteen & Schorr, 1982)), and Gleser et al. (1981) suggest at least five other dimensions on which disasters may differ, with consequent differences in outcome for the victims; these factors are: (1) the extent of the serious, unexpected life threat to individuals; (2) the degree of bereavement suffered by the victims; (3) prolongation of physical suffering, life threat and lack of normal necessities; (4) extent of displacement or changes in former environment and new modes of living after the disaster; (5) the proportion of the community affected by the disaster and (6) the cause, whether natural or man-made.

The disaster-affected individuals ("victims") can also be differentiated in terms of loss or degree of danger experienced and the category of victim can be widened to include observers and rescuers (eg., Wilkinson, 1983) or rated as primary, secondary, etc., as described by Taylor (Taylor & Frazer, 1981) in his classification of Erebus victims.

It is possible that the proportion of victims who are at risk to experience emotional and psychological problems can be predicted better when the contribution of these factors is better documented. The present study is concerned with the identification of relationships between aspects of a disaster (bushfire) and psychological outcome in a group of volunteer firefighters, all of whom lived in the Macedon region. Four of the factors outlined above were specifically investigated.

In addition, the hypothesis of Gleser et al. (1981) that "spouses will evidence similarity in the nature and extent of their psychopathology" was tested by including the spouses of firefighters in the study. It has been suggested that the coping and adjustment processes of an individual are reflected in everyday and family life (Lazarus, 1981). The family itself has

been depicted as a source of stress or of support (Heller, 1979). Identification of the role of the factors mentioned above in conjunction with the family environment may lead to more effective interventions following disaster.

A study of firefighters in the Country Fire Service of South Australia who fought similar fires at the same time has found that 9 months after the event, 20% (10 out of 50) had developed post traumatic stress disorders (McFarlane & Croft, 1984). While predictions of similar levels of psychological morbidity could be made for the volunteers in the Macedon Country Fire Authority brigades, there are some interesting differences between the groups. The first is that, unlike the S.A. volunteers, the majority of whom came from outside the fire affected region, the Macedon and Mt. Macedon volunteers lived in the area through which the fires burnt, some lost houses and many had houses which had to be defended against the fire. Secondly the area was swept by fire twice in two weeks, and the volunteers had barely been stood down after the first fire before the second one flared up. The third difference is that press reports of the coroner's enquiry were misleading in that they were perceived as unfavourable for the Macedon brigades.

The first of these differences means that the Macedon CFA volunteers are likely to differ from the CFS in terms of three of the dimensions listed above (i.e., the prolongation of physical suffering, lack of normal necessities; the extent of displacement and changes in former environment; and the proportion of the community affected by the disaster), leading to the prediction that the CFA volunteers would show a higher incidence of post traumatic stress disorder. The other differences between the groups could also be expected to increase the stress on the CFA volunteers.

Since the spouses were directly threatened by the fire, their outcome should be affected by all the factors listed above, and some of them would be expected to show some psychopathology. Thus an interaction between the firefighter's and the spouse's impairment may occur, resulting in an enhancement of the firefighter's problems. If this is so, disruption of family interactions should also be evident. To date there has been little investigation of the disruption which families experience following disaster, nor has the contribution of family factors to recovery been thoroughly studied.

The aims of this study were (1) to assess the psychological effects of two severe bushfires on volunteer CFA firefighters, some of whom lost houses and all of whom lived in the district they were defending; (2) to compare measures taken at 1 month and 11 months after the event; (3) to assess the psychological effects on the spouses and families of CFA volunteers 11 months after the fires and (4) to identify environmental and other variables which might account for the psychological state of firefighters, spouses and families, 11 months after the fires.

METHOD

Subjects:

Thirty seven CFA volunteer firefighters, 34 males, 3 females from the Macedon brigade (N=18) and the Mt. Macedon brigade (N=19) responded to an appeal through their brigade Captains to participate in the survey. Response rate was high from the active members of both brigades. (The percentage cannot be specified, as "active membership" was a subjective description supplied by the captains.) Thirty two firefighters were married, 1 was divorced and 4 were single. The spouses or partners of 31 of the firefighters also completed questionnaires and 33 questionnaires for families were completed.

Materials

1. Firefighters questionnaire: this consisted of demographic questions; questions about the perception of public reaction to CFA, and involvement in CFA activities; personal losses; exposure to fire as a CFA volunteer, degree of danger; Impact of events scale + extra questions; life events before and after the fire; 12 item GHQ; questions about health, drug and alcohol taking.
2. Questionnaire for firefighter's spouse: this consisted of demographic questions; questions about perception of public reaction to CFA, involvement of spouse and self in CFA; personal losses; exposure to fire, including danger; Impact of Events + extra questions; life events before and after the fire; 12 item GHQ; questions about health, drug and alcohol taking.
3. Questionnaire for families (firefighter and spouse were asked to fill this in jointly): questions about children and ages, property loss and present living arrangements; reconstruction, including financial assistance; thoughts about future fires, and a family scale of 12 items. The family scale was made up of items which had been found to reflect family disturbance in a study of children following the South Australian fires (McFarlane, personal communication).

Procedure

Questionnaires were taken to a regular meeting of each brigade and handed to volunteers by the experimenters who also spoke briefly about the survey. Questionnaires were treated as confidential and were returned in sealed envelopes to the University or collected by a psychologist research assistant. The time of administration was January, 1984, 11 months after the February bushfires.

Study of CFA less than one month after fires

Within two to four weeks of the second fire (and in one case, before the second fire) 20 members of the Mt. Macedon brigade were interviewed using a semi structured interview, and given the 12 item GHQ and IES scale to complete. Of these, 11 had lost their houses. Fifteen of this group also participated in the follow up study 11 months after the fires. Only the GHQ and IES data are reported here.

RESULTS

No significant differences between the Macedon and Mt. Macedon brigades were found on any major variable, except in answer to the question "Overall have the thoughts and feelings you have had since the fire been a worry to you?" Members of the Macedon brigade gave a stronger affirmative response (sig at .04) than the Mt. Macedon brigade members. Mt. Macedon volunteers also attended meetings significantly more often than did Macedon (17 meetings vs. 5 meetings). There were no significant differences in their response to any of the scales incorporated in the questionnaire (ie., GHQ, Impact of Events, Life events). The data for the two brigades were therefore combined and the means (and SDs) for the firefighters and their spouses on the 12 item GHQ, and IES, Intrusion and Avoidance subscales of the IES and the Life events are shown in Table 1.

TABLE 1
FIREFIGHTERS AND SPOUSES SCORES ON GHQ,
LIFE EVENTS, IES AND SUBSCALES

SCALE	FIREFIGHTER MEAN (S.D.)	SPOUSE MEAN (S.D.)
G.H.Q. (12 item)	2.81 (3.7)	3.13 (3.79)
Life Events		
Before fires	0.50 (9.70)	0.52 (0.81)
After fires	0.78 (1.17)	0.42 (0.81)
Impact of Events	19.5 (17.53)	22.5 (16.75)
Intrusion	12.0 (10.60)	11.9 (9.27)
Avoidance	7.6 (8.30)	10.6 (9.00)

TABLE 2(a)

Comparison of scores on GHQ, IES and subscales on 19 Firefighters less than 1 month and 37 Firefighters 11 months after the fires.

Scale	Time of testing	
	March 1983 (N=20)	Jan 1984 (N=37)
	Mean (SD)	Mean (SD)
GHQ (12 item)	2.95 (2.91)	2.81 (3.7)
Impact of Events	31.0 (15.08)	19.5 (17.53)
Intrusion	17.65 (6.89)	12.0 (10.60)
Avoidance	13.35(10.17)	7.6 (8.30)

TABLE 2 (b)

GHQ: Frequency of cases above and below the cut-off (4/5)

	March '83.	June '83	Jan '84
Non case	14 (70%)		28 (75%)
Males			
Case	6 (30%)		9 (25%)
Non case	9 (47%)*	9 (24%)#	21 (67%)@
Females			
Case	10 (53%)*	29 (76%)#	10 (32%)@

*Burnt out and not burnt out Macedon women

#Burnt out women

@Firefighters' wives

In Table 2(a) a comparison is made of the scores on the GHQ and IES + subscales for 1 month and 11 months after the fires. While scores on the IES have dropped markedly (mean of 31 to 19.5) there is little difference in the mean GHQ scores (2.95 vs. 2.81).

The number of cases (i.e., those who are considered to show "nonpsychotic psychological impairment") are shown in Table 2(b). Figures for women resident in the Macedon district, obtained at 1 month and 4 months after the fires, are shown for comparison. It will be noted that there is little difference from time 1 to time 2 for firefighters.

Independent stepwise multiple regression analyses were performed for each of the major outcome variables (i.e., firefighters GHQ, spouses GHQ and factors obtained by way of factor analysis of the family scale). Initial inspection and analysis of the data revealed that firefighters' and spouses' own intrusion scores (as measured on the IES) were very highly correlated with their respective GHQ scores. As both constitute outcome variables and because GHQ provides a more adequate description of consequences in terms of symptomatology, it was decided to exclude intrusion scores from the regressions to GHQ, although the intrusion score of the other partner was retained. The multiple regression procedure utilised is essentially conservative in that for inclusion in the equation, each variable must contribute significantly of its own accord.

Firefighters GHQ

The results of the stepwise multiple regression to firefighters GHQ are shown in Table 3. Spouse's GHQ proved to be the best predictor, with the question relating to injury to the firefighter also accounting for a significant proportion of the variance.

Spouses GHQ

Similarly, firefighter's GHQ proved to be the best predictor to spouse's GHQ. Spouse's avoidance, as measured by the IES, also contributed significantly, with higher avoidance being associated with higher GHQ scores.

TABLE 3

STEPWISE MULTIPLE REGRESSION OF VARIOUS
SCORES (EXCLUDING OWN INTRUSION SCORE) TO
FIREFIGHTERS' AND SPOUSES' GHQ

Dependent Variable	Sig. loading variables	Beta	R square change	F	d.f.
F/F GHQ	Spouse GHQ	0.70	0.49	22.67**	1,24
	Sustained injury	0.32	0.10	16.46**	2,23
Spouse GHQ	F/F GHQ	0.70	0.49	19.83**	1,21
	Spouse avoidance	0.36	0.12	15.61**	2,20

Family Scale Factors

The family scale utilised constitutes a new questionnaire based on an earlier version by McFarlane. A reliability analysis of the scale showed that internal consistency was good (standardised item alpha 0.79). A factor analysis was performed to identify more uniform and discrete factors, prior to the multiple regression analysis. The factor analysis identified three factors which are described in Table 4, together with the factor scores for individual variables. Separate stepwise multiple regression analyses were then performed to each factor (Table 5). Firefighter and spouse GHQ scores and both intrusion subscale scores were included in the multiple regression analysis.

TABLE 4
FACTORS OBTAINED FROM A VARIMAX ROTATED
FACTOR ANALYSIS OF THE FAMILY SCALE

<u>Factor 1: Irritable and withdrawn</u>	Factor score coefficients
2 More irritable with each other	.20
5 More withdrawn from each other	.16
6 Avoid discussing upsetting problems	.29
8 Fight more with each other	.21
11 Worry about putting strain on each other	.28
12 Avoid discussing the fire or its effects	.28
<u>Factor 2: Less contact and less enjoyment together</u>	
3 Spend less time together	.39
7 Less contact with friends, relatives	.45
9 Harder to enjoy activities together	.29
<u>Factor 3: Closer</u>	
1 Closer than before	.42
4 Often talk if there is a problem	.43
10 A better sense of goals and values	.40

TABLE 5
STEPWISE MULTIPLE REGRESSION OF VARIOUS
SCORES TO THREE FAMILY FACTORS

Dependent Variable	Significantly loading variables	Beta	R square Change	F	d.f.
Family 1	Spouse avoidance	0.58	0.34	11.59**	1,23
	Reaction of public	-0.49	0.24	12.53**	2,22
	Spouse L/events after	0.40	0.11	7.71**	3,21
	Spouse's previous disasters	-0.25	0.06	4.97*	4,20
	F/F intrusion	0.29	0.06	6.87*	5,19
	F/F major role in unit maintenance	-0.31	0.07	11.53**	6,18
	Working longer hours	-0.33	0.06	20.02**	7,17
Family 2	F/F preoccupied about the fires	0.51	0.26	7.94**	1,23
Family 3	Still living in same family house?	0.45	0.20	5.85*	1,23

Family Factor 1: Irritable and withdrawn.

Seven variables were detected as significant predictors to the first factor from the family scale. In general terms, families who reported higher levels of avoidance, fighting and irritability also showed:

- (i) more avoidance of thinking about the bushfires
- (ii) higher ratings of unfavourability of public reactions to the CFA role.
- (iii) higher spouse report of life events after the fire,
- (iv) less prior experience of bushfires and disasters by the spouse,

- (v) more intrusive thoughts regarding the fires by the firefighter,
- (vi) less involvement in unit maintenance by the firefighter,
- (vii) less likelihood of increases in working hours since the fire on the part of one or both spouses.

Family factor 2: Less contact and less enjoyment together.

The only variable predicting significantly to this factor was the spouse's rating of the firefighters continuing preoccupation with the fire in the preceding three months.

Family factor 3: Closer than before and having shared goals.

The sole variable predicting to this factor was whether the family were resident in the same house since the fires (i.e., whether or not they were burnt out).

DISCUSSION

In general the results indicate that substantial numbers of firefighters and their spouses experienced minor psychological disturbances both soon after the fires and as long as 11 months later (Tables 2(a) and (b)). A strong relationship between the psychological disturbance amongst couples was also evident in that the best predictor of either the firefighter or spouse GHQ was the partner's own GHQ score. This supports Gleser's finding that psychic impairment was intercorrelated to a greater degree than could be accounted for by similar background and disaster experience (Gleser et al., 1981). A number of variables, discussed below, have also been identified as associated with aspects of family functioning.

Inspection of the Impact of Events data for firefighters (Table 2(a)) shows that, as would be expected one month after the bush-fires, extremely high intrusion and avoidance scores were evident, suggesting the presence of post traumatic stress disorder in the firefighters at this time (Horowitz, Wilner, Kaltreider & Alvarez, 1980). Subsequently both intrusion and avoidance scores decreased substantially. However during this time the level of non-psychotic psychological disorder (as indexed by the percentage of cases and non cases according to the GHQ) remained at the original levels (Table 2(b)).

In contrast, comparison between the GHQ scores of the firefighters' spouses at 11 months after the fire and those of an unselected group of Macedon and Mt. Macedon women, one month after the fires, reveals a noticeable decrease in the percentage of cases of psychological disturbance. The percentage of cases in the female sample at one month was 53%, whereas the percentages for firefighters at one month and 11 months, and their spouses at 11 months were all around 30%. While a number of interpretations of these data are tenable, the results are in

accord with a large body of previous research which indicates that females report greater distress following disaster than males (Melick, 1978). It is generally not "masculine" to report emotional symptoms (Danziger, 1978) but this does not necessarily indicate that emotional disorder is absent.

As noted, the best predictor of either partner's level of psychological disturbance was the other partner's level of disturbance. Such concordance may be related to theories of assortative mating (the joining together of partners with similar levels of emotional stability or health) or interactive models of disturbance (Stuart, 1980). The level of injury sustained by the firefighters was also a significant predictor of their longer term psychological adjustment (Table 3). The injuries sustained appear quite substantial (they include smoke inhalation, skin and eye burns) although treatment was mainly provided by ambulance officers rather than in hospitals or by doctors. An index of self rated danger experienced during the fires did not predict significantly to the 11 month GHQ score but it may be that those who are prepared to report general health symptoms will also report injury more freely. Alternatively, physical injury may provide a tangible reminder for a significant period after the disaster which predisposes individuals to later or more long lasting disturbance.

The other significant predictor of spouses GHQ score was their level of avoidance as measured on the IES scale. Horowitz et al. (1980) noted significant correlations between high avoidance scores and a wide variety of psychological disorders, particularly anxiety disorders. It appears that for the spouses, avoidance of painful reminders of the disaster is associated with continuing psychological disturbance, and this may be related to repression and failure to work through the painful emotional aspects of the experience. On the other hand, spouses who are still disturbed may avoid thinking about the fire, which in itself may contribute further to their disturbance.

The spouses' level of avoidance is also related to Family factor 1 (see below), however there is no significant relationship between spouses GHQ (at 11 months) and this index of family disturbance (Table 5). This suggests that spouse avoidance is differentially related to both the spouse's own disorder and family disturbance, although the mechanisms of these separate associations cannot be fully explained at this point. One possibility is that in some families an avoidant spouse is able to deal with her psychological disorder in some way which limits disturbance to other family members, whereas in other families, particularly those firefighters with high intrusion scores (see below), more widespread family disturbance is evident.

Three factors were identified from the Family scale, two of which appear related to family disturbance, while the third indicates a more benevolent outcome (Table 4). The third factor concerns families who reported being closer and having a better sense of goals since the fires. The only significant predictor

to this factor was whether the family had been burnt out. Beneficial psychological consequences are most commonly reported during the immediate post-disaster utopia period, although evidence of some longer term benefits has been noted elsewhere (Gleser et al., 1981). In the present case, both a unification derived from a sense of guilt about not being burnt out, and a realisation of extreme good fortune may have played a part.

Of the more detrimental family factors identified, Factor 1 proves the most complex to interpret. Perhaps the most striking feature is the apparent mismatch on this factor between high spouse avoidance scores and high intrusion scores for the firefighters. The spouses in the families who score high on this factor are also less likely to have experienced previous disaster (which may provide a degree of stress inoculation) and more likely to report the experience of more disruptive life events since the fires. Firefighters from high scoring families are less likely to be involved in the maintenance of the local CFA unit, and either one or both partners is less likely to be working more since the fires. High scoring families also rate public reaction following the inquests as more negative than do less disturbed families.

Although a variety of interpretations of this factor are possible, a picture emerges of a somewhat inward looking family who are highly sensitive to external events and encountering (according to the spouse) more negative life events. The spouse in such families tends not to have experienced disasters, (is probably younger), and avoids thinking about the fires, whereas the firefighter rates himself as being somewhat preoccupied with it. The irritability, fighting and avoidance within such families seems likely to be related to the different coping styles of husband and wife, and perhaps an inability to discuss or deal with such differences.

The final factor from the family scale (Family factor 2) concerned lack of time for contact and enjoyment together or social activities. The significant predictor was the spouse's rating of the firefighter as being continually preoccupied with the fire in the preceding 3 months. Interpretation is difficult, beyond suggesting that this preoccupation interferes with family activities.

Conclusions and Implications

Although the present results are preliminary some potentially interesting findings are apparent. Evidence has been presented which indicates that psychological disorder may continue to be manifested for at least 11 months after the disaster. Furthermore, psychologically disturbed individuals are particularly likely to have spouses with similar levels of disturbance. The reasons for this are not obvious from the present study. Firefighters who report physical injury and spouses who avoid thinking about the fires tend to be most likely to show psychological impairment. Both of these factors may be significant

when designing postdisaster interventions and perhaps psychological interventions should be aimed at these individuals. Injured firefighters are easily identified, and the intervention may reduce trauma.

It may be possible to design interventions which encourage discussion of the experience of the disaster and which may facilitate spouses who would otherwise avoid this working through of painful emotional experiences. These speculative suggestions have the advantage of being in accord with common clinical wisdom.

Surprisingly, the level of psychological disturbance of the firefighter and spouse did not predict significantly to family disruption although a number of other factors did. Of particular importance is an apparent mismatch between the coping styles utilised by the different partners, particularly in dealing with thoughts about the fires. This seems to indicate that rather than absolute levels of individual disturbance, it is the ongoing interaction patterns between partners which contribute to the harmony or lack of it within the family. If evidence accumulates that family disruption following disaster is significant and has detrimental long term consequences, it would seem prudent that disaster management should include family based therapy approaches.

REFERENCES

- Danziger, K. 1978. Socialisation. Harmondsworth: Penguin.
- Gleser, G.C., B.L. Green & C. Winget, 1981. Prolonged Psychosocial Effects of Disaster, N.Y.: Academic.
- Goldsteen, R. & J.K. Schorr, 1982. The long-term impact of a man-made disaster: An examination of a small town in the aftermath of the Three Mile Island Nuclear Reactor Accident. Disasters 6 50-59.
- Heller, K. 1979. The effects of social support: prevention and treatment implications. IN: Goldstein, A.P. & F.H. Kainfer, Maximising Treatment Gains: Transfer Enhancement in Psychotherapy. N.Y.: Academic.
- Horowitz, M.J., N. Wilner, N. Kaltreider, W. Alvarez. 1980. Signs and symptoms of posttraumatic stress disorder. Arch. General Psychiatry, 37, 85-92.
- Lazarus, R.S. 1981. The stress and coping paradigm. In C. Eisdorfer, D. Cohen, A. Kleinman & P. Maxim (Eds.), Models for clinical psychopathology. N.Y.: Spectrum.
- McFarlane, A.C. & G. Croft. 1984. Firefighters and Ash Wednesday. Paper given at the Human Behaviour in Disaster Workshop, Australian Counter Disaster College, April.
- Melick, M.E. 1978. Self reported effects of a natural disaster on the health and well being of working class males. Crisis Intervention, 9, 12-31.
- Stuart, R.B. 1980. Helping Couples Change: A social learning approach to marital therapy. N.Y.: The Guilford Press.
- Taylor, A.J.W. & Frazer, A.G. 1981. Psychological Sequelae of Operation Overdue following the DC10 crash in Antarctica. No.27, Victoria University Pub. Psychology, Wellington.
- Wilkinson, C.B. 1983. Aftermath of a Disaster: The collapse of the Hyatt Regency Hotel skywalks. Amer. J. Psychiatry, 140, 1134-9.

PREPAREDNESS FOR BUSHFIRE

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Introduction

Well before the recent disastrous bush fires in the Adelaide Hills a survey was carried out there of preparedness for the occurrence of bush fire.

The study was based on the gathering of information at an on-the-spot interview carried out by one of the authors. Demographic data collected made particular reference to the participants' lifestyle. Observations of hazard reduction measures taken on each property were made. Information was collected regarding fire-fighting equipment that had been purchased and plans of action in the event of fire that had been made. Also determined was the knowledge of precautions that should be taken in the event of bushfire to minimize loss.

The general lack of preparedness of the 85 respondents will be discussed.

The idea will be developed that participants had developed a fantasy of what a bush fire entailed; that this fantasy included as a central concept the notion that they would escape unscathed and that this fantasy blocked out a number of appropriate responses they might otherwise have made.

Introduction & Background

The Adelaide Hills, like the fringes of all Australian capital cities have experienced an influx of those who seek to combine the advantages of rural living with ready access to the amenities of the city. The Hills were of considerable concern to fire authorities long before the disastrous Ash Wednesday fires of 1983 as an area considerably at risk of bush fire.

Recent residential development in the Adelaide Hills has increased both the number of lives at stake and the real estate value of the area. It has been generally believed that many of the new inhabitants are not aware of the fire problem or what they can do in order to reduce the fire hazard. Most of the new residents are not commercial farmers but commute daily to Adelaide. This situation depletes the fire fighting population on weekdays because those people at home during weekdays are frequently mothers with young children.

The majority of bushfires are not of natural origin but man-made. Hence residential development in the Hills not only means that losses from fire are likely to be greater, but also because of the larger population, could mean that more opportunity exists for fire ignition.

The Objectives of the Present Study

The present study concerns the environs of Gumeracha District Council, located centrally within the Hills' region and was completed by 1980. Its objectives were

- (1) to identify the adjustments residents in the area were making to the bushfire hazard and to establish if any particular lifestyle group was substantially better adjusted to the bushfire hazard situation; and
- (2) to determine any relationship that exists between residential development in the Hills and the incidence of fire.

The Choice of Study Area

The Gumeracha District Council area was chosen because

- (a) it is neither the most rural nor the most urban area of the Adelaide Hills
- (b) it has a variety of land forms and land uses
- (c) its Council offered support to the study through provision of information and access to records.

Location and Physical Features

The study area is located within the Mt Lofty Ranges. It is hillier in the west where north west oriented gullies funnel fires, particularly since north westerly winds coincide with times of extreme fire danger. These gullies reduce access to fire and the greater slopes encountered in this area increase the rate of the forward progress of fire substantially.

Climate

Summer maximum temperatures average 26°C, with a low relative humidity, averaging 40%. It is always the extremes of temperature which are most important with regard to bushfire: e.g. the Clare fire (1965) occurred when the temperature was 38°C, relative humidity 9-13% and on Ash Wednesday (1980) the temperature reached 43°C, with a relative humidity of 30%. The study area is rated highly susceptible to fire throughout summer and early autumn. The Gumeracha District Council fire restriction period extends from December 1st to March 31st.

Vegetation

This comprises low open forest and woodland. The former, located on steep slopes of the study area in the west, is a particular fire hazard to the region. There are also areas of forestry under the control of the South Australian Woods & Forests Department.

Water Resources

The Mannum - Adelaide pipe-line passes through the area with the result that many major settlements and many farms have a reticulated water supply. There are several reservoirs in the district.

The Relationship between Residential Development and Fire Incidence

In the present study some difficulty was experienced in collecting reliable data regarding this relationship. In particular there appeared to be a considerable under-reporting of fires. The general conclusion reached was that climatic variables are of greater importance : not only do the three hottest months (December, January and February) account for 44% of the fires, but the main daily peak for the commencement of fires occurs shortly after noon, at the time daily temperatures reach their maximum. Regarding the effects of increased population, it was concluded that this contributed only slightly to the incidence of fire.

The Sample

The sample was selected from residences outside settlement nodes since the objective was to compare "rural retreaters" with commercial farmers on a number of parameters, in particular to see whether new residents adopting new lifestyles had adjusted to the bushfire hazard of their new environment. A 20% sample from rate paying allotments with residences was selected randomly from Council Valuation lists. In the case of refusal (of which there were seven) or failure to locate the resident after three visits, the next nearest residence was substituted. The final sample size was 85.

The Data Collected

The more important aspects of the data collection concerned

- (1) Observation of the hazard reduction measures taken
- (2) Indications of residents' lifestyle and
- (3) The residents' adjustment to the fire hazard.

During the survey, which involved a visit to each property by the first author, observations of the respondent's property and house were made. Otherwise a question/answer format was used and a questionnaire completed. Section A of the questionnaire looked at family structure, socioeconomic status and the proportion of the household's income derived from the property. Section B was directed at determining the state of preparedness of the property (for example the availability of water and fire-fighting equipment as well as whether the way the property had been developed included an awareness of fire hazard). Section C was concerned with the preparedness of the respondent (e.g. what plan of action would be implemented in the event of threat from a bushfire, where information about fire precaution had come from, how the local fire service would be contacted in case of fire and so on).

Section D was directed at determining the respondent's involvement in the community.

Any adult member of the household was interviewed. Interviews were carried out both during the week and at the weekends. 63.5% of the respondents were male. Generally questioning was completed in 15 minutes.

Results

(i) Lifestyle Differences

Substantial differences existed between the "rural retreaters" on the one hand and the commercial farmers on the other, with the part-time farmers occupying an intermediate position.

Thus compared with rural retreaters, the commercial farmers

- (a) Had larger allotments of land
- (b) Did more to reduce the fire hazard on their property
- (c) Had more and better items of fire fighting equipment on their property
- (d) Spent more time on their property
- (e) Had more experience of bushfires.

As far as the amount of time spent on the property is concerned, it is worth commenting that the presence of somebody on a property can be seen as mitigating risk : if a fire breaks out there, the person on the spot can institute fire fighting measures and call for assistance either from neighbours or the fire services.

(ii) Plans of Action in the Event of Bushfire

Here the emphasis was not on property maintenance precautions and the provision of equipment, but on the plan of action to be followed should a bushfire occur. It is here that the inadequacy of the respondents is most obvious. No significant relationships existed between response to this part of the questionnaire and lifestyle characteristics. A total of 45% of respondents said that a household plan of action existed. However, when respondents were asked what precautions they would take they had little to offer. Thus the Country Fire Service (C.F.S.) has an information sheet on which ten precautions are listed but respondents could rarely cite more than three of these.

These precautions are given in Table 1 (the percentage of those citing each precaution is given on the right).

Table 1 : Knowledge of C.F.S. recommended precautions.

Close door and windows

14%

Clear furniture and rubbish from the yard	3.5%
Connect hose and water walls	62.0%
Fill gutters with water	28.0%
Shut off gas and electricity	1.2%
Fill containers/bath with water	1.2%
Remove curtains etc. from near windows	1.2%
Close internal doors	1.2%
Prepare food and valuables for easy exit	1.2%
Dress appropriately (heavy/woollens)	1.2%

The average score (out of a possible maximum of 10) was 1.2. The source of information about these procedures was given as the C.F.S. by 35% and General Knowledge by 65%. More than one source per respondent was permitted. 41% agreed that they had received information from the C.F.S. "this season". 88% stated that they had done as much as they could to reduce the fire risk "this season". 86% believe that volunteer brigades (i.e. the C.F.S.) provided adequate fire fighting services. 16% had committed the C.F.S. phone number to memory.

Discussion

The strong support for the volunteer brigades plus the poor understanding of precautions to take in the event of a bushfire suggest a reliance on the notion that fires can be put out readily by others before substantial damage has occurred. This distancing of respondents from their own responsibilities was shown also in their expressing the misconception that tourists and day trippers were responsible for the majority of fires. This was found also by Edgell & Brown (1971) to be a commonly held misconception in the Dandenong Ranges, east of Melbourne. In the Adelaide Hills, as elsewhere, most of the fires whose cause is known result from the activities of local inhabitants rather than the behaviour of tourists. For example, burning off getting out of control is a more common cause of fire than camp fires and barbecue fires spreading to surrounding vegetation.

There are a number of general statements that can be made about disaster preparedness. The first is that awareness of the possibility of disaster is not in itself a sufficient stimulus for taking action. Such awareness is often accompanied by a substantially complacent attitude. This is very much the case in New Zealand in areas threatened by earthquake (Britton, 1981). The second general statement is that myths of invulnerability often develop as part of denial and are a major cause of complacency and unpreparedness. Such myths develop frequently as, for example, when flood mitigation schemes are seen quite spuriously as affording protection on a scale far greater than is really the case (Parker & Harding, 1978). They also develop when a disaster has previously occurred in that area, so that residents indicate that they have "already had the big one" implying that another major catastrophe could not occur. Further, those with peripheral experience of disaster tend to disregard warning and underestimate dangers compared with those who have been at the centre of disasters in the past (Riley, 1971). Threatened disasters which do not materialize strengthen the view that subsequent threats will evaporate likewise.

Thirdly one needs to remember that memories of past misfortunes fade. Immediately important new problems take over current concern. For most individuals major disasters are rare occurrences within their life span (Blundell, 1977).

When people are confronted with a disaster threat outside their own experience, we suggest that they construct a fantasy which defines the disaster in terms that they can cope with. Fantasy involves people constructing inwardly, often by means of imagery, what they cannot experience externally. Fantasies may intensify anxiety leading to flight from disaster-prone areas to places perceived as safer to live in. Often, however, they help to dissipate it so that for many fantasizing is a defence mechanism protecting against unpleasant affects like anxiety and depression. Such fantasies, if they reduce anxiety, tend to involve an imaged reduction in the strength of the natural forces unleashed at the times of natural disaster. One can infer this from comments made by disaster victims - comments such as "I never thought wind could do so much damage" or "I just had no expectation that the floods would reach the level they did" and so on.

What is being proposed here is that people living in an area threatened by bush fire construct a fantasy, a mental image of the fire behaving in a manner which leaves that individual's house and family intact. Such a person, when given a list of precautions that can be taken in the event

of fire attends to and subsequently recalls those that support the fantasy - which is that their house will not catch fire. He or she therefore remembers to connect hoses, water the walls and fill the gutters with water but does not remember other measures which could be appropriate if a small part of the house caught fire, because the fantasized situation does not allow for that occurrence (see Table 1). It is suggested that evidence presented from this study offers support to the importance of fantasy in determining situation-appropriate action or inaction.

The question arises whether more needs to be done to increase preparedness for the natural disasters of flood, cyclone and bush fire particularly in those areas, such as the Adelaide Hills, which are at particular risk. In time of war people accepted quite readily the idea of air raid wardens - part-time rostered volunteers whose job it was to patrol suburban and other areas and tell people if they were showing lights. However, the air-warden system probably worked as well as it did because of the immediacy of the air raid threat. In a bush-fire situation such a system might be valuable, but only at times of perceived immediate risk: hot weather, dangerous wind direction and tinder-dry vegetation conditions.

People who neglect precautions may put more than just their own property and family at risk. Hence leaving preparedness decisions entirely to individual residents seems scarcely adequate. Present systems usually rely on the dissemination of information (including recommended levels of disaster mitigating equipment and property maintenance). Are such systems adequate? Because memories are short and complacency much more comfortable than disaster awareness, we suggest that they are not.

Note

This report has been developed from a Master of Environmental Studies thesis submitted to the University of Adelaide by the first author.

References

- Blundell, K.J. (1977). Living with earthquakes. *Disasters*, 1, 41-46.
- Britton, N.R. (1981). What have New Zealanders learnt from disasters in their own country? *Disasters* 5, 384-390.
- Edgell, M.C.R. & Brown, E.H. (1971). Bushfires in the Dandenong Ranges. *Victoria's Resources* 13, 10-14.
- Parker, D.J. & Harding, D.M. (1978). Planning for urban floods. *Disasters*, 2, 47-57.
- Riley, J.A. (1971). *Disaster - storm ahead*. University of Texas.

SOCIAL SUPPORT AND ADJUSTMENT

FOLLOWING DISASTER

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A growing body of research indicates that well developed social support networks may have a generally beneficial effect and provide a protective influence for individuals in times of stress whether these are normal life stressors or more devastating events such as disaster (Barton, 1970; Caplan, 1974; Cobb, 1976; Dean & Lin, 1977). For example, many of those who experienced the Granville rail disaster and who developed chronic symptoms lacked an effective family support system (Boman, 1979). Similarly, twelve months after the Three Mile Island incident, a significant inverse relationship was evident between perceived support and psychological symptoms (Fleming, Baum, Gisriel & Gatchel, 1982). Barton (1970) has referred to the emergence and development of supportive behaviour following disaster as the "therapeutic community" and suggests that this "helps to compensate for the sorrow and stress...with an unexpected abundance of personal warmth and direct help" (p.207).

However, despite the generally recognised benefits little is known regarding the effective or essential components of social support. For instance, Cobb (1976) suggests that the essential ingredients are caring, warmth and membership of a network of mutual obligation whereas Caplan (1981) proposes that support primarily provides cognitive guidance and feedback which facilitate mastery of stressful circumstances or reactions. Additionally, social support can be viewed in terms of its structure, content and the process by which the first two are utilised (Leavey, 1983). In the case of a disaster, the structure may consist of already existing networks of family, friends and neighbours and will be increased to encompass other affected individuals and the special resources made available such as health and welfare services, professional advisors and so on. This increased structure constitutes Barton's "therapeutic community" (1970). One post disaster study found that following a tornado, younger individuals made greater use of official agencies than did older age groups, and that they also experienced more psychological and physical impairment (Bell, Kara & Batterson, 1978).

In contrast to an emphasis on one central component of social support, Schaefer and colleagues (Schaeffer, Coyne & Lazarus, 1981) suggest that emotional (empathy, attention), tangible (practical assistance) and informational (information regarding the disaster, its consequences and sources of assistance) aspects may all be important. The suggestion that these function separately in their relation to psychological symptoms and stressful life events has been supported by the finding that low tangible support and emotional support, in conjunction with certain life events, were independently related to depression and negative morale while informational support was associated with positive morale (Schaeffer et al., 1981).

The process of using social support will be impeded or facilitated by the personality and other characteristics of the individual (Leavy, 1983). Locus of control (Rotter, 1966) constitutes one such characteristic and research has indicated that individuals with an external locus of control (that is, those who perceive that events in their life are controlled by external forces such as God, fate, the government) generally fare worse and have more symptoms than do individuals with an internal locus of control (those who perceive that they control events within their lives and environment), (Kobasa, 1979; Kobasa, Hilker & Maddi, 1979). While Rotter (1975) suggests that this may in part be due to internals' tendency to repress failures and unpleasant experiences, it may also be related to the groups differential utilisation of social support networks. For instance, Sandler & Lakey (1982) report that externals tend to have larger social support networks than do internals but the latter derive greater benefit from their relatively smaller networks.

At this point there has not been sufficient research to permit the elucidation of the essential components and parameters of social support and this is particularly the case in the area of disaster research. Although high levels of social support have been indicated as beneficial following disaster, little attention has been focused on which individuals may be at greatest risk in relation to social support available, and what types of support, provided by different sources, is particularly beneficial.

In this paper a preliminary analysis is made of some of these questions. The study was designed to assess the psychological and physical status of women four months after they had lost their homes in one of two bushfires which devastated the Macedon and Mt. Macedon communities in February, 1983. The relative contributions of age, locus of control and different types of social support as related to particular health outcomes were assessed, as was the question of whether locus of control affected the utilisation of different types of support.

METHOD

Subjects

Questionnaires and interviews were completed by thirty-eight female residents of the Mt. Macedon and Macedon townships ranging in ages between 21 and 70, mean age 39.7 years whose homes were destroyed in the bushfires during February, 1983. The women were undertaking home duties or were working locally. Contact occurred at drop-in centres established after the Ash Wednesday fire (N=12) or in their own homes following word of mouth or other contact (N=26). Although no relevant data were collected the sample included members from a wide range of socioeconomic groupings reflecting the general mix of the Macedon and Mt. Macedon populations.

Measures

(i) General Health Questionnaire

The General Health Questionnaire (GHQ) was used to assess non-psychotic impairment and neurotic symptoms (Goldberg, 1972). The GHQ has been validated and used extensively in Australia (Tennant, 1977). In this study the 30 item version was utilised and the cut-off score of 4/5 used to classify non-cases and cases.

(ii) Physical Health

A questionnaire comprising 17 questions concerned with physical problems and symptoms such as headaches, backache, diarrhoea and chest pains in terms of frequency during the previous two months was used to determine physical health status. A similar questionnaire has been previously used in a study of factory workers in Melbourne (Romas, 1982). Higher scores indicate higher levels of physical impairment.

(iii) Locus of Control

Rotter's Locus of Control (LOC) Scale (1966) was used to determine an internality-externality score for each individual.

(iv) Social Support

The content and structure of social support were investigated in the following manner:

Content: A modified version of the Inventory of Socially Supportive Behaviours (ISSB) developed by Barrera, Sandler and Ramsay (1981) was used to obtain the frequency with which the women were the recipients of socially supportive behaviours during the past month. The ISSB was modified by deleting

four items from the test to provide 12 instances of emotional (EMO), tangible (TAN) and informational (INF) support as classified by Schaeffer and colleagues (1981). The ISSB is characterised by questions which are behaviour specific and lack overlap with physical or psychological adjustment.

Structure: For each item, the subject was asked to indicate the provider of the support according to one of eight categories: Husband or partner; family member; friend; neighbour; member of a group such as Red Cross, Church, Lions; member of a self-help group; a health professional; an adviser such as bank manager, solicitor, council officer.

Procedure

In June and July 1983 approximately four months after the bushfires the women were interviewed briefly, the purpose of the study explained and they completed the questionnaires described above. All subjects were assured of confidentiality. The average completion time of the questionnaire was one hour.

Design and Analysis

A step-wise multiple regression program (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975) was used enabling a sequence of predictor variables to be ordered with respect to their independent contribution to the variance of the criterion measures (Overall and Klett, 1972). As will be described the criterion measures utilised in separate analyses were based on principal component subscales obtained from the GHQ and the PH questionnaire. The independent variables in each analysis were age, LOC, EMO, TAN and INF.

The unreliability of regression weights can present difficulties when using multiple regression analysis. It should be noted that with the sample size of approximately 40 in this study, the standard error of beta weights could be as high as .25 (Kerlinger and Pedhazur, 1973: p.442). While practical considerations placed restrictions on the present sample size, the number of subjects in relation to the number of independent variables (approximately 8:1) is larger than the 3:1 ratio considered useful in producing replicable results (Adams, 1978).

Principal components analysis were used to transform the given set of variables in the GHQ and the PH questionnaire to a set of composite variables or principal components which are orthogonal to each other (Nie *et al.*, 1975). A varimax rotation was also incorporated to transform a given set of variables into a smaller set of principal components without making assumptions about the underlying structure of the original variables (Child, 1976).

The step-wise multiple regression procedure involved a separate analysis for each obtained principal component as the criterion measure. These separate analyses were performed because there was no a priori rationale for preferring to examine particular health outcomes over others. Rather than the normal GHQ scoring system a likert scoring method was employed for this measure for use in the principal components analysis. Reliability analyses were also performed to determine the consistency of each item in each principal component (Anastasi, 1976).

Separate t-tests were used to determine whether there were any significant differences in the receipt of emotional, tangible and informational support for internal scores below, and external scores above the median on the Rotter LOC scale.

RESULTS

Means and standard deviations for each of the measures are shown in Table 1.

TABLE 1

TOTAL SCORES OBTAINED FROM 38 BURNT OUT WOMEN

VARIABLE	MEAN	S.D.
GHQ scores	11.3	7.3
PH scores	39.9	13.1
Locus of Control	12.0	3.4
Emotional support (frequency)	2.5	0.7
Tangible support (frequency)	1.9	0.4
Information support (frequency)	1.9	0.6

The mean GHQ score is considerably higher than that of 5.5 obtained from a community sample of women in Perth (Burvill & Knuiman, 1983.) Physical Health scores are not different from those obtained for either employed or unemployed males and females in Melbourne (Cook & Kinsella, personal communication, 1983.)

Locus of control scores for this group are very similar to the mean of 12.14 obtained for Australian female university students (Gorman, Jones & Holman, 1980).

Informational and tangible support were received twice on average in the preceding month whereas emotional support was reported as occurring more often.

Using the recommended cut-off score of between 4 and 5 (Goldberg, 1972) for the identification of non-cases and cases, 29 of the 38 women can be classified as showing non-psychotic psychological impairment. Of these 29 cases, 25 showed very high scores (greater than 8).

Principal Components Analysis

Eight principal components with eigen values greater than 1.0 (Child, 1976) were identified from the GHQ and together they accounted for 79.1% of the variance in the data. Only the first four principal components which accounted for 61.5% of the variance were used in further analysis. Factor loadings of greater than .4 were chosen as recommended by Child (1976) for the present sample size. The other four components were discarded because of very low factor loadings, difficulty in interpretation or reliability coefficients of less than 0.8.

For the Physical Health questionnaire, five principal components were identified but after criteria similar to those described above were applied, two principal components accounting for 42.9% of variance were utilised.

Stepwise Multiple Regression Analysis

Table 2 presents the four principal components for the GHQ together with the significantly loading variables identified in each of four separate stepwise multiple regressions and significance levels.

TABLE 2
GHQ PRINCIPAL COMPONENTS AND SIGNIFICANTLY
LOADING VARIABLES

Principal component (% cumulative variance)	Significantly loading variables	Beta	R square Change	F	d.f
1. General depression & strain (36.1)	AGE	-0.49	0.22	9.2	1,32
2. Nervous and despairing (47.1)	AGE	-0.44	0.12	6.5	1,34
3. Mentally unalert (54.6)	EMO	0.33	0.19	4.9	1,34
	AGE	-0.34	0.05	4.6	2,33
4. Lack of self confidence (61.5)	AGE	-0.53	0.17	10.3	1,32

For each principal component an inverse relationship with age was found and for the mentally unalert component there was a positive relationship with the level of emotional support.

The two principal components for the PH questionnaire, together with significantly loading variables identified in each of the two separate stepwise multiple regression analyses and significance levels are shown in Table 3

TABLE 3
PHYSICAL HEALTH PRINCIPAL COMPONENTS AND
SIGNIFICANTLY LOADING VARIABLES

Principal component (% cumulative variance)	Significantly loading variables	Beta	R square Change	F	d.f.
1. Gastric and internal disturbance (29.3)	LOC	0.37	0.15	6.4	1,35
	INF	0.32	0.10	4.8	2,34
2. Fatigue, aches and pains (42.9)	AGE	-0.38	0.20	6.5	1,35

Positive relationships between locus of control and informational support were identified for the first principal component (gastric and internal disturbance) whereas an inverse relationship occurred between age and the second component: (fatigue, aches and pains).

Relationship between support providers and emotional, tangible and informational support.

In Table 4 the number of times people provided emotional, tangible and informational support is shown according to the ISSB. The numbers given do not necessarily represent separate individuals.

TABLE 4

TOTAL NUMBER OF OCCASIONS WHEN CATEGORY MEMBERS
PROVIDED EMOTIONAL, TANGIBLE AND INFORMATION SUPPORT

ISSB STRUCTURE CATEGORY	EMO	TAN	INF
1. Husband, partner	142	39	53
2. Family members	303	175	147
3. Friend (s)	604	259	373
4. Neighbour(s)	36	16	17
5. Welfare/Service agencies	25	70	50
6. Self help groups	5	11	17
7. Health professional	21	4	35
8. Advisors	11	11	67

The largest number of support providers came from categories 2 and 3 (family members and friends). Husbands or partners provided primarily emotional support although this pattern was evident for each of the first four categories. Informational and tangible support rather than emotional help was provided by welfare and service agencies, such as Red Cross, church and Lions. Advisors (bank managers, local councillors, etc.) generally gave informational support whereas health professionals helped with informational and emotional support.

Locus of control and support content

To determine whether the frequency of receiving social support was related to internal or external locus of control, the scores on the Rotter I-E scale were split at the median score so that 19 below the median were grouped as externals. Three separate t tests (Mendenhall, McClave and Ramey, 1977) were employed to determine whether there were any significant differences between internals and externals in the mean frequency of emotional, tangible and informational support. No significant differences were found.

DISCUSSION

Levels of psychological and physical impairment and associated factors.

The finding of major elevations in GHQ scores in the group of women studied at four months following the bushfires lends support to the view that persistent adverse reactions occur following disaster (Tyhurst, 1951; Raphael, 1979). Twenty nine of the 38 women had scores indicating a high probability of a diagnosable non-psychotic psychiatric disorder. The two major features of this disorder are inability to carry out normal functions and the appearance of new reactions of a distressing nature. The mean score in this study (11.3) is considerably higher than that obtained from a general population sample of women in Perth (mean 5.5), (Burvill & Knuiman, 1983). Even the use of an extremely conservative cut off score of 8/9 would yield a ratio in this sample of 25:38 cases. At four months after the disaster there is certainly evidence of "adverse psychological reaction" rather than "minimal psychological reaction" (Hohaus, 1983) although the persistence of such adverse reaction in the longer term remains to be evaluated.

Abrahams and colleagues (Abrahams, Price, Whitlock and Williams, 1976) also found increased psychological symptoms following the Brisbane floods, particularly for females. These authors suggested that remaining at home all day with reminders of losses may have contributed to this increased symptomatology. Similar factors may have been operative in the Macedon townships. Even though "Drop In" centres were established to provide a meeting place for the women living in caravans, only a relatively small group used such facilities. Some time was spent at the two "Drop In" centres in order to recruit subjects for this study, however over the four week period only 12 women were contacted. The majority of the subjects completed the test materials in temporary dwellings.

The Physical Health scores gave no evidence of increased physical symptomatology in this sample as compared to mixed sex samples of employed and unemployed Melbourne residents (Cook & Kinsella, personal communication). Although Tyhurst (1951) indicates that increased physical illness can be expected in the post impact phase, Abrahams et al. (1976) also found a preponderance of psychological as compared to physical symptoms, although a minor increase in headaches and gastric upsets were found 12 months after the Brisbane floods. Current models of psychosocial stressors and physical illness emphasise relatively long term processes involving various neuro-hormonal and immune systems (Selye, 1956; Henry & Stevens, 1977). In the light of this it is noteworthy that no evidence of increased physical symptomatology was found two months after a flood, whereas significantly more physical illness was evident three years after the event (Melick, 1978). In contrast, Gillis (1980) refers to minor physical complaints occurring during the turmoil-recoil phase (days to weeks) such as sleeplessness, diarrhoea and hypochondriachal aches and pains. It may be that physical reactions of an acute nature are prevalent soon after a disaster and more chronic reactions occur after a more substantial period. The current study may have been conducted at an hiatus between these acute and chronic reactions.

Although correlations between the variables are not reported here a significant correlation ($r=.63$) occurred between the GHQ and Physical Health scores. However the principal components analyses yielded apparently discrete components. The GHQ produced four components of sufficient value and reliability (general depression and strain; nervous and dispairing; mentally unalert; lack of self confidence) whereas the Physical Health Questionnaire yielded two (gastric and internal disturbances; fatigue, aches and pains) which are described in Tables 2 and 3.

For all the GHQ components, age was negatively correlated and this was also the case for the second Physical Health component. These positive relationships between increasing age and well being are consistent with the results of Bell, Kara and Batterson (1978) who reported more psychological and physical impairment amongst the younger age group following a tornado. They also reported that the elderly sample was atypical of the general elderly population in that they were more highly educated and had higher income and employment status. The group therefore had access to more physical and social resources after the tornado. Although no socioeconomic data were collected in the present study it may be that similar factors were operative in this sample.

Further speculations must include possible additional demands placed on younger women by virtue of dealing with families and young children whilst in temporary accommodation. Child behaviour disturbances such as increased anxiety and aggression are commonly reported following disasters (Burke, Borus, Burns, Millstein and Beasley, 1982) and it seems likely that these, together with associated lack of sleep, would contribute to mothers' feelings of despair, nervousness, lack of self confidence, depression, lack of alertness and fatigue. A further possibility is that the older women may have had greater experience in dealing with life stressors (and dealing with insurance companies, bureaucracies, house building, etc.) which would provide a form of "stress inoculation" (Meichenbaum, 1983). Once again it becomes crucial to assess longer term adjustment as the higher impairment of younger women may be reactive to their immediate situation and diminish as they move to more permanent accommodation and as child adjustment improves.

The major predictor of being mentally unalert was frequency of emotional support (Table 2). Those finding difficulties concentrating may be offered more emotional support and reassurance, or it may be that such women are particularly sensitive to, and value emotional support, and are therefore more likely to report instances.

The remaining component of Physical Health was gastric and internal disturbance (Table 3). This (and perhaps the other Physical Health component) is similar to the major type of physical disorder reported 12 months after the Brisbane floods (Abrahams et al., 1976). Externality was associated with increased gastric and internal disturbances. This finding is consistent with the suggestion that those who believe they have control over stressful events and their consequences will remain relatively healthy (Kobasa, 1979; Kobasa, Hilker & Maddi, 1979; Johnson & Sarason, 1979). Perceived lack of control can lead to increased subjective stress responses which can produce an effect on health via the immunological system and through neuroendocrinological response (Henry & Stevens, 1977). Gastric and internal illhealth may of themselves create a shift towards externality since such problems could continue to overwhelm the individual with feelings of being powerless to cope in their present situation. Alternatively, the relationship obtained may be due to the tendency of internals to repress their unpleasant symptoms thereby creating a spurious positive relationship between internality and good health (Rotter, 1975). Once again assessment of longer term adjustment may clarify these and other relationships.

As with locus of control, informational support significantly improved prediction of gastric and internal problems with informational support being positively related to the incidence of gastric problems. This relationship was most likely due to the receipt of information regarding the health disturbance and the provision of feedback concerning the associated problems.

Locus of Control and Disaster

The mean locus of control scores obtained for this sample support the view that it is inappropriate to apply the original Rotter I-E scale norms to the Australian population (Lange, 1980). The mean of the women's scores compared with the mean of 12.14 obtained for females enrolled in first year psychology at the Australian National University (Gorman, Jones & Holman, 1980) suggests that the scores obtained in this study do not support the finding (Smith, 1970) that individuals experiencing a crisis tend to score higher, and therefore become more external initially. This may be due to the time elapsed before data were collected in this study.

The loss of home and possessions constitutes a severe crisis where effective coping mechanisms (Pearlin & Schooler, 1978) are required to gain positive control over the current situation. While the difficulties of living in temporary accommodation were still present four months later, many of the women had already arranged for the rebuilding of their homes and some bushfire relief money had been received. It might be expected that perception of having greater control over the situation would be increased by this stage.

Providers of Social Support

Consistent with Drabek & Key's (1976) finding that relatives and friends were the most frequent sources of help for primary victims of a disaster, this study found the categories of people mentioned most were relatives and friends. Friends were mentioned more often than family members. Emotional support was largely received from spouse or partner, family and friends. It is a common attitude in those who have suffered to feel that they can share an experience only with someone when there is trust and a feeling of solidarity.

The "therapeutic community" proposed by Barton (1970) largely depends on the giving and receiving of emotional support, and this exchange was still evident four months after the disaster. The emotional support provided by spouse or partner, family and friends may be particularly beneficial in protecting health at this time - a view supported by Boman (1979) who reported a relationship between lack of an effective family support system and chronic health symptoms.

The fact that neighbours were mentioned fewer times than friends results from an unclear distinction between the two categories. The disaster recovery period appeared to distort the neighbour-friend dichotomy as it was explained to the respondents before completing the questionnaire. Either the respondents had a wider network of friends than neighbours before the fires or an increased network of friends was developed after the fire, and the status of neighbour became subsumed in the category of friend.

Relationship between support content, locus of control and recovery

No difference was found between internals and externals in the frequency that they reported receiving different types of support. Previous studies (reviewed in the introduction) have revealed relationships between locus of control and support network size and utilisation (Sandler & Lakey, 1982). This study attempted to extend these findings by examining possible relationships between support content and locus of control. The apparent inconsistency between the results of this study and the earlier reports may reflect a difference between quantity of support and support content, or factors specific to the timing of this study may have changed the relationships between social support and the other variables, including locus of control.

At the time these data were collected, it was apparent that the "therapeutic community" was still in operation, with large amounts of emotional and physical help still available. Given these circumstances it seems possible that relationships between social support and other variables might be "swamped" in these disaster affected individuals.

In a somewhat similar manner, the discrepancy between this and previous studies (Barton, 1970, Bell et al., 1978, Fleming et al., 1982) regarding the importance of social support may be related to the relatively short time elapsed and the apparent abundance of support available. Of the independent variables, age is by far the most important in predicting psychological, and to a lesser extent, physical problems.

The data reported here reflect the state of affairs four months post-disaster. Given the plentiful support available at this stage, it may take longer for substantial discrepancies in social support and the differential consequences, if any, to become apparent. A follow up study of social support and recovery in this population is planned.

REFERENCES

- Abrahams, M.J., Price, J., Whitlock, F.A. & Williams, G.1976. The Brisbane floods: their impact on health. The Medical Journal of Australia, 2: 936-939.
- Adams, K.M. 1979, Linear discriminant analysis in clinical neuropsychology research. Journal of Clinical Neuropsychology, 1 259-272.
- Anastasi, A. 1976, Psychological Testing, 4th edition., New York.
- Anderson, C.R. 1977 Locus of control, coping behaviours, and performance in a stress setting: a longitudinal study. Journal of Applied Psychology, 62: 446-451.
- Barrera, M., Sandler, I.N. & Ramsay, T.B.1981. Preliminary development of a scale of social support: studies on college students. American Journal of Community Psychology, 435-447.
- Barton, A.H .1970 Communities in Disaster: A Sociological Analysis of Collective Stress. New York: Anchor Books.
- Bell, B.D., Kara, G., & Batterson, C.1978. Service utilization and adjustment patterns of elderly tornado victims in an American disaster. Mass Emergencies, 3 71-81.
- Burvill, P.W. & Knuiiman, M.W. 1983. Which version of the general health questionnaire should be used in community studies? Australian and New Zealand Journal of Psychiatry, 17: 237-242,
- Caplan, G.1974 Support Systems and Community Mental Health, N.Y., Behavioural Publications.
- Caplan, G.1981 Mastery of stress: Psychosocial aspects. American Journal of Psychiatry, 138: 413-420.
- Cobb, S.1976 Social support as a moderator of life stress. Psychosomatic Medicine, 38: 300-313.
- Dean, A. & Lin, N. 1977 The stress-buffering role of social support. Journal of Nervous and Mental Disease, 165: 403-417.
- Drabek, T., Key, P., Erickson, & Crowe, J.1975 The impact of disaster on kin relationships. Journal of Marriage and the Family, 37: 481-494.
- Erickson, P.E., Drabek, T.E., Key, W.H. & Crowe, J.L. 1976 Families in disaster: patterns of recovery. Mass Emergencies, 1: 203-216.

Fleming, R., Baum, A., Gisriel, M. & Gatchel, R.J. 1982. Mediating influences of social support on stress at Three Mile Island. Journal of Human Stress, 8: 14-22.

Goldberg, D.P. 1972. The detection of psychiatric illness by questionnaire, Maudsley Monograph, No. 21, Oxford University Press, London.

Gorman, P., Jones, L. & Holman, J. 1980. Generalizing American locus of control norms to Australian populations: A warning Australian Psychologist, 15: 125-127.

Henry, J.P. & Stevens, P.M. 1977. Stress Health and the Social Environment, New York: Springer-Verlag.

Johnson, J.H. & Sarason, I.G. 1979. Moderator variables in life stress research. In: Sarason, I.G. & Spielberger, C.D. (Eds.) Stress and Anxiety, Vol. 6., Hemisphere publishing, U.S.A.

Kerlinger, F.N. & Pedhazur, E.J. 1973. Multiple Regression in Behavioural Research, Holt, Rinehart and Winston, U.S.A.

Kobasa, S.C. 1979. Stressful life events, personality, and health: an enquiry into hardiness. Journal of Personality and Social Psychology 37: 1-11.

Kobasa, S.C., Hilker, R., & Maddi, S.R. 1979. Who stays healthy under stress? Journal of Occupational Medicine, 21: 595-598.

Lange, R. 1980. Changes within the Australian population to more external control beliefs. Australian Psychologist, 15: 495-497.

Leavy, R.L. 1983. Social support and psychological disorder; a review. Journal of Community Psychology, 11: 3-21.

Melick, M.E. 1978. Self-reported effects of a natural disaster on the health and well-being of working class males. Crisis Intervention, 9: 12-31.

Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K. & Bent, D.H. 1975. SPSS Statistical package for the social sciences, U.S.A., McGraw-Hill Book Co.

Mendenhall, W., McClave, J.T. & Ramey, M. 1977. Statistics for Psychology 2nd ed., Duxbury Press., U.S.A.,

Overall, J.E. & Klett, C.J. 1972. Applied Multivariate Analysis, N.Y. McGraw-Hill.

Romas, N. Stress at work. 1982. Unpublished honours thesis, Department of Psychology, La Trobe University.

Rotter, J.B. 1966. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80.

Rotter, J.B. 1975. Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 43: 56-67.

Sandler, I.N. & Lakey, B. 1982. Locus of control as a stress moderator: the role of control perceptions and social support. American Journal of Community Psychology, 10: 65-80.

Schaefer, C., Coyne, J.C. & Lazarus, R. 1981. The health related functions of social support. Journal of Behavioural Medicine, 4: 381-405.

Smith, R.E. 1978. Changes in Locus of Control as a function of life crisis resolution. Journal of Consulting and Clinical Psychology, 46: 1192-1211.

Tennant, C. 1977. The General Health Questionnaire: a valid index of psychological impairment in Australian Populations. Medical Journal of Australia, 2: 392-394.

TWELVE MONTHS AFTER THE BUSHFIRE

A FOLLOW-UP STUDY OF THE 1983 SOUTH AUSTRALIAN BUSHFIRES

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The Mental Health Research and Evaluation Centre was approached by the South Australian Health Commission to undertake a study of the victims of the 1983 Ash Wednesday bushfires. It was decided that the study should attempt to assess the impact of the disaster in terms of; (i) overt forms of difficulties; (ii) covert psychological problems, reported over 12 months after the fires; and (iii) the effectiveness of any subsequent interventions.

In recent years there has been a growth in knowledge of the effects of natural and man-made disasters on the psychological functioning (Kinston & Rosser, 1974), as well as the social and economic problems, of those affected. However, a review of disaster literature indicates that not only does very little research exist on the effects of bushfires, (Wettenhall, 1975), but comprehensive studies of populations affected by any disaster are virtually non-existent. Furthermore, it is suggested that as bushfires represent a relatively frequent, recurrent and devastating threat, it is difficult to generalize general disaster research to the bushfire experience.

Investigations using systematic questionnaire analysis have suggested that, given time, a large proportion of the psychiatric morbidity is resolved within the first year after a catastrophic event. Parker's (1977) study into the effects of Cyclone Tracy on a group of evacuees showed that, using the General Health Questionnaire (GHQ), the level of psychiatric morbidity had returned to an Australian general population control level at 14 months. This raises many important questions which remain to be answered. For example, although many of the individuals examined in clinical case studies, such as those of Raphael (1977) and Cobb and Lindeman (1943), may have significant psychiatric symptomatology; (i) do those individuals see themselves as being psychiatrically ill; (ii) would they consider seeking treatment if they were not already in contact with psychiatric services?; and (iii) the possibility that covert mental health problems may be presented and treated as physical health problems must always be considered. In a disaster situation where physical injuries are likely to occur, the likelihood of this happening may be increased.

Andrews and Tenant (1978) indicated that there is much need to examine the pattern of health care utilization after

disaster because there is considerable debate about the cause for the increased frequency of presentation to general practitioners. Following the floods in Bristol (Bennet, 1970) in 1968, and the floods in Brisbane (Abrahams et al, 1976) in 1974, it was suggested that a significant increase in physical disease followed such calamities. However, the dilemma always exists as to whether these disasters simply lead to the early manifestation of preexisting morbidity or whether psychological disorders were presenting as physical symptoms and being misdiagnosed.

This question is an important issue for mental health service administrators if they are going to be able to accurately anticipate the demand of mental health services following a natural disaster.

A number of problems exist in transforming the research that has been conducted to date into the practical provision of services. One such problem arises out of the methodology used in a number of research projects, where there has been no attempt to define the question of "caseness" and the perception of need for treatment, as designated by the victims. Another problem also arises from the fact that few studies and reports ask the victims about the use and satisfaction of services in relation to the problems reported. Clearly, in terms of planning services following a disaster, it is important to consider the victims' experiences and opinions.

The present study attempts to overcome, to some extent, these and other such difficulties.

AIMS

1. Assess the psychological impact of the fires on those affected in terms of the socio/economic and health difficulties experienced since the fires.
2. Investigate the services that victims obtained and the degree to which such services were found to be of help.
3. Obtain information concerning the extent of the difficulties, both overt and covert, faced by those affected by the fires immediately after, as well as during and after the twelve month period following the bushfire.

INSTRUMENT

Due to the large number of subjects to be included in the study, a self-administered questionnaire was considered

appropriate. The following points were included in the questionnaire.

- (i) Identification of the circumstances of persons involved in the fire, particularly at the time of the fire, because of the likelihood that those circumstances could be important variables in the development of subsequent difficulties. Questions concerning whether or not the individual's life was threatened, and separation from family at the time of first hearing about the fire;
- (ii) Illness suffered before the bushfires, as well as during the year after the fires. A brief subjective list of illnesses was devised and included such illnesses as "heart problems", mental illness and arthritis.

As a further indication of mental health, the 28 item General Health Questionnaire, (G.H.Q.), was also included. This scaled version separates the scales concerning severe depression and anxiety and was therefore considered the most appropriate shortened version. In order to establish comparative data, the 28 item G.H.Q. will be given to a representative sample who were unaffected by the fires.
- (iii) Nature of problems experienced since the fires. A list of possible problems, such as financial, property, and work difficulties was devised and respondents were asked to rate the degree of severity of the problem immediately following the fires, during the year, and at the time of responding.
- (iv) Assistance obtained. Respondents were asked to indicate whether or not assistance was received from a range of possible sources, such as family, government and voluntary agencies. They were further asked to indicate up to 3 problems (from iii) for which the source was contacted and to rate the time and extent of help received. Questions related to counselling were also asked and will be compared with the G.H.Q. score obtained.
- (v) Demographic data.
- (vi) Open questions. Respondents were asked to express their opinion of services they encountered and were given the opportunity of making any further comment they felt to be appropriate.

Several issues were considered in determining the content of the questionnaire.

- (1) Whilst it was realized that a lengthy questionnaire would undoubtedly discourage some recipients, it was considered preferable to a shorter or more superficial format.
- (2) It was also recognized that some of the questions could disturb respondents by drawing attention to painful events and problems. For this reason, the attempt was made to exclude intrusive questions.
- (3) A contact name and phone number was also given should the respondent require assistance and/or advice.

SAMPLE

It was considered to be an essential part of the study that the population contacted be as representative and as inclusive of bushfire victims as possible. It was decided that rather than select a smaller "representative" sample, all registrants should be provided the opportunity to express and share their experiences in an organised way.

Although many organisations had lists of such victims, most were incomplete and a great deal of duplication was present. The Department for Community Welfare agreed to assist by making available to us their master register. This register contained all individuals who had registered with Red Cross immediately following the fires (approximately 90%), and those who later registered with D.C.W. for financial assistance (approximately 10%). The total number of people on this file is 2,997. However, those with the same address, or who had incomplete or no forwarding address, were excluded from the sample, leaving a study population of 2,254.

Five groups of persons are represented in the sample; those who :

- (i) suffered personal injury;
- (ii) lost a relative or whose relative/s may have suffered injury;
- (iii) lost property;
- (iv) were threatened by the fire, but suffered no injury or loss,
- (v) were not directly threatened by the fire.

METHOD

Approximately one week after the first anniversary of the 1983 Ash Wednesday bushfires families, who were registered by the Department for Community Welfare as victims in South Australia, were contacted. Two thousand two hundred and fifty four families were mailed two copies of the questionnaire, together with a request that two adult family members complete one copy each, as it pertained to them. A reminder letter was sent out several weeks later and the media broadcast and publicised the importance of the study in order to encourage victims to respond.

RESPONSE

This paper does not attempt to present any of the data received which is still in the process of collation and analysis. However, approximately 1,500 people have completed the questionnaire. Approximately 200 envelopes have been returned because of addresses being unknown. An attempt to locate these persons was made with the assistance of the Department for Community Welfare, which reduced this number to 140. It was noted that the majority of returned envelopes were marked "left address". It is reasonable to suggest that, as this represents a group of victims who had not returned to their "homes" over a year after the fires, they may have severely suffered as a result of the fires. It is very unfortunate that we were unable to reach more people from this population. Unfortunately, there is also an unknown quantity of duplicated names and addresses included in the original figure of 2,254.

An important factor that was anticipated, but underestimated, was the emotional impact that the questionnaire had upon the study population. Many of those contacted responded by phone or mail to express their willingness to complete the questionnaire and their inability to do so. In some cases, distress expressed was of such significance that the person was referred to an appropriate professional to obtain assistance.

The following comment, which was received, exemplifies the major difficulty of this kind.

"I feel it's about time to tell you how I feel about the disturbing past.

1. I was out fighting the fire and when I came home I found nothing left.
2. All the help which was promised never came. I fixed my fence 6 months before the fire, then it was burnt out and I didn't receive any help. Some farmers didn't have a fence to start with, and a few weeks after the fire they were given a new one.

3. The Lions Club promised to shift the rubbish away and in the end I had to do it myself.
4. The Red Cross kindly helped me financially and I was also helped by the public, but it looks to me as if the insurance company is running some kind of racket, because the money that I was insured for I never received. I had to accept what they offered me because I am financially broke due to the fire. You think that when you pay your premium you're covered, and when you're in trouble you find you're in dire straits.
5. Since the bushfire, I have never done a decent day's work because I am mentally and physically unfit, it's just problem after problem.

In the evening I can still hear my mate when he was calling to me as he was burning.

Your papers stir up all these bad memories, so you can understand why I don't want to answer it."

Although we received many letters such as the above, the questionnaire would not be returned, and are therefore not represented in the data. However, the nature of these responses highlights the importance of investigations such as this.

It was discovered that a number of families returned only one questionnaire, despite the fact that two were sent. In some cases it was noted that the return of two questionnaires was indicative of different opinions. For example, a husband would suggest that all was well, whereas the wife would report family difficulties.

It is also recognised that many people who were not badly affected by the fire would not have responded as they did not feel that they could contribute in a significant way.

DISCUSSION

Fires, such as the Ash Wednesday bushfires, will, unfortunately, occur again. Each summer, people living in high risk areas are confronted with this fear and many of the people affected last year face the possibility of the experience and trauma recurring. Because of this, bushfires can be seen to represent a unique form of disaster, and it is therefore difficult to generalise disaster research concerning psychiatric morbidity, for example, to the bushfire situation. The present study attempts to provide such baseline data.

Power and Wettenhall (1970), having studied the organisational systems involved in the 1967 Tasmanian bushfires, commented that disaster planning does not go much beyond rescue-phase activity.

Following the 1983 fires, numerous reports and investigations have been carried out by government, voluntary and community agencies. However, there appears to have been no attempt to assess the problems experienced by victims, their unmet needs, or their satisfaction with the services provided. In the initial stages following disasters, emphasis is given to providing food, housing, and financial assistance. Teams are set up to provide victims with help and support. But, how effective they tend to be in practice can only be ascertained by asking the victims directly. The authors also hold the view that, because of the emotional impact of the questionnaire, the extent of pathology and the problems experienced will be incompletely represented. The study, it is felt, will probably underestimate these problems.

Given that such limitations exist, the response by letters and phone calls alone indicated that many people are still suffering as a result of the fires. Whether this is due to feeling unable to approach services, or whether these people are being undetected by services, remains to be answered.

The need to obtain a clearer understanding of the impact of bushfires on the lives of those affected is apparent. It is hoped that the present study will provide a step in the direction of gaining that understanding, as well as providing effective responses in the future.

REFERENCES

- Abrahams, M. J., Price, J., Whitlock, F.A. and Williams, G.
1976. The Brisbane Floods, January, 1974: Their Impact on
Health. Medical Journal of Australia 2, 936.
- Andrews and Tenant, 1978. Medical Journal of Australia.
- Bennet, G. 1970. Bristol Floods 1968 Controlled Survey of the
effects on health of local community disaster. British Medical
Journal, 3, 454.
- Cobb, S. and Lindeman, E. (1943). Neuropsychiatric observations
during the Coconut Grove Fire, Ann. Surg. 117, 814.
- Kinston, W., Rosser, R. 1974. Disaster : Effects on Mental
Health and Physical State. Journal of Psychosomatic Research,
18, 437.
- Parker, G. 1977. Cyclone Tracy and Darwin Evacuees on the
Survival Restoration of the Species. The British Journal
of Psychiatry, 130, 548-555.
- Power, J.M. and Wettenhall, R.L. 1970. The Psychological Manage-
ment of Disaster Victims. Public Administration, 29 : 165.
- Raphael, B. Personal Disaster : 1981. The Australian and New
Zealand Journal of Psychiatry 15 : 183 - 198.
- Raphael, B. 1977. The Granville Train Disaster, Psychological
Needs and their Management. Medical Journal of Australia, 1,
303,
- Titchener, J.L. and Cap, F.T. 1976 Family and Character Change
at Buffalo Creek, American Journal of Psychiatry, Vol. 133,
295.
- Wettenhall, R.L. (1975) Bushfire Disaster: An Australian
Community in Crisis. Angus and Robertson, Sydney.

PLANNING FOR MENTAL HEALTH COUNTER DISASTER SERVICES

VICTORIA'S EXPERIENCE OF ASH WEDNESDAY

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INTRODUCTION

The activities of mental health teams in the first twelve months of the bushfires showed that a number of roles and styles of service delivery can be utilized in providing assistance to a large scale community disaster. In that time, more than 80 workers drawn from 9 separate mental health agencies participated in the State disaster relief response. As the services evolved from a predisaster planning vacuum, considerable improvisation was required to integrate the mental health programme with other community recovery processes. Although planning errors were made and opportunities missed, the services produced some innovative and valuable strategies for mental health intervention in future disasters.

PREDISASTER PLANNING

Victoria's disaster planning framework prior to Ash Wednesday was broad in its coverage but included only a nominal psychological component. In fact, the two major support sub-plans - medical and welfare - each assumed a portion of responsibility for provision of psychological services in a disaster. The Medical Displan, based upon an emergency services model in which issues of rescue and protection of public health take precedence, included mental health representation, at least hypothetically, as part of the emergency medical team structure. The implication within the plan was that these services would be used for specialist assistance, to be called upon when and if psychiatric casualties emerged. No specific plan existed for putting services on the ground and roles of the mental health team members were left undefined. Similarly, there was no provision for the long-term nature of recovery. In contrast, the Welfare Displan focused upon short and long term recovery issues and anticipated that psychological needs would form a distinct feature of the human welfare crisis caused by disaster. An active outreach model, similar to the approach of Heffron (1977a) and other American workers, (eg Zarle, Hartsough and Ottinger, 1974; Tuckman, 1973) was favoured by disaster welfare planners and although not specifically written into the plan, had been discussed at pre Ash Wednesday planning meetings. No attempt was made to link the outreach approach to the activities of the mental health teams that were proposed to operate under Medical Displan.

Each plan therefore required further development, but this required that they be cross referenced. Health and welfare disaster planners had not resolved the potentially conflictual elements within their plans, nor addressed the basic differences in models and philosophies. It was most significant that, as the Welfare Disaster Plan was to assume authority in the post impact period, there was no health presence on its central co-ordinating body.

A second planning factor that dominated Ash Wednesday services was the heavy centralisation of activation and co-ordination functions, in line with the early developmental stage of the larger State Disaster Plan. While it was anticipated that planning would occur at shire and regional level, these structures were not in place prior to Ash Wednesday. Consequently, agencies sharing some responsibility for the fire affected areas had not been brought together with a co-ordinated disaster relief framework. Given the magnitude of the Ash Wednesday event, this had implications for all disaster relief programmes but was particularly critical to the delivery and co-ordination of mental health services.

EARLY RESPONSE

The early response of the central mental health administration was characterised by caution and passivity. Much of the early energy was devoted to clarifying potential roles and solving the organizational complexities of Displan. The major problem was lack of reliable information on the location and general needs of the fire affected communities, although several suggestions were registered by the central health authority that psychiatric teams may be required. Offers of assistance were also received from local and interstate professionals as well as from concerned individuals in the community. A mental health team despatched to one of the fire devastated areas reported on problems within the helpers, but was unable to make a confident prediction on the likely needs of the larger community. It was clear that a mental health response would need to be improvised and, although not having a particular direction to offer, regional units were alerted to potential roles and requested to place teams of suitable staff on standby.

The passivity of the early stance is best portrayed by the establishment of a 24 hour telephone counselling service on day 3. This service was announced through a Ministerial press release and the community encouraged to make contact for enquiries or requests for assistance. Mobile teams were available to respond to any requests on a rostered basis over a 2 day period. The telephone counselling service failed to attract attention as it clearly did not meet the needs of the disaster affected population. If mental health services were to make an effective and valuable contribution then it was clear that a more active approach would be required.

This fact was particularly highlighted by the absence of mental health services within the outreach support programme initiated under the Welfare Displan, which had as its broad objectives the provision of support, practical assistance, and the assessment of individual needs and referral to appropriate agencies. The lead agency, the Victorian Council of Churches, together with the Department of Community Welfare Services, initiated a large scale visitation program in which church officers were organized to recruit, plan and brief volunteers to make personal visits to every fire affected household in the State. Within a week of impact the programme commenced and over a period of 4 weeks, more than 3,000 outreach visits were made by approximately 250 outreach workers comprising clergy, volunteer professional workers in the human service area and selected lay people.

The Ministerial press release announcing the mental health telephone service and mobile teams on standby understandably aroused some concern and confusion amongst welfare planners. Suspicion regarding the motives of mental health intervention was evident and this was exacerbated when one particular "volunteer" psychiatric team independently entered one of the fire affected areas and attempted to make personal contact with victims of the disaster. The urgent need for co-ordination led to a meeting between mental health and welfare administrators on day 6 and this point marked the beginning of a significant shift in the mental health stance. The absence of mental health teams was recognized, but concern was expressed that an overt psychiatric presence would stigmatize natural healing processes and alienate the fire affected community. It was feared that imported mental health teams would operate independently of the emergent local co-ordinating bodies and retard community recovery by exacerbating the already high levels of anxiety and confusion. In a step aimed at increasing the acceptability of the services, it was agreed that mental health teams would work under the direction of the local welfare co-ordinating body.

Each mental agency with a regional responsibility for the fire areas was instructed to deploy teams and make contact with local health and welfare providers. In most instances, the teams were small and multidisciplinary based, and although comprised of individuals who had practised within a community mental health model, generally had no prior experience of disaster work. The first task faced by the teams was the establishment of credibility with local workers. In all but one of the fire affected areas, mental health services had not played an active role prior to the bushfires and were justifiably regarded as "outsiders" and considerable sensitivity was required in dealing with this issue. A marked constraint was evident in the experience of the one mental health team that had operated a pre bushfire community nursing service within their particular fire affected area. The referral networks that had been developed by the agency and the knowledge of pre-disaster community traditions allowed this team to operate more effectively at an earlier stage than other teams.

referral. Over a period of 3 weeks 720 households were visited and with the consultation offered by the mental health workers, approximately twelve percent of individuals or families were judged to warrant further follow up, many of them urgently (Victorian Welfare Displan Executive, 1983). Through the close co-operation that developed between the local volunteer counsellors and the mental health professionals working in this programme, a paradigm was created that offers a model for mental health intervention in future large scale Australian disasters.

Public Education and Information

A second role played by the Mental Health teams was the dissemination of information to promote community awareness of normal response patterns to disaster. Within days of the fires, two psychiatric professionals prepared separate leaflets on the reactions of children and adults and in the following weeks, ten thousand copies were prepared in brochure form and distributed widely through all fire affected areas¹. (Footnote 1). (The leaflets were used extensively in the outreach programmes, at welfare relief centres, medical agencies and educational settings).

Other approaches to community education included the limited use of print and electronic media, and the setting up of public meetings in conjunction with local government agencies, where the overt agenda focussed upon such issues as childrens' reactions to disaster, family stress and parenting issues. These meetings provided a valuable forum at which the problems and issues facing the community could be discussed. An innovative approach in one area was the publication of a regular newsletter providing updated information regarding grants and services. Mental health staff participated in the production and prepared articles about normal stress reactions with advice on how and when to seek professional assistance. This approach provided a supportive link in a dislocated community.

Primary consultation.

The provision of primary care to individuals was a role common to all mental health teams. Some teams actively encouraged referrals for primary consultation as a means of establishing a secondary consultative network. Others downplayed their primary care role, preferring to support local agencies in dealing with problems and only accepting referrals of the most difficult cases. Many of the early referrals were child centred and, in some areas, specialist child psychiatric teams were called out to augment the existing mental health workers.

Footnote 1 After the Crisis is Over, Dr Julie Jones, Royal Childrens Hospital; Reactions You and Your Children May Experience as Fire Affected Persons, Dr Paul Valent, Prince Henry's Hospital.

Referral sources were multiple. One team established a strong link with the local general practitioner who was overwhelmed by the number of individuals perceived to require emotional support. This provided an interesting contrast to several other areas where general practitioners fiercely guarded their clientele from the mental health team and publicly prided themselves in being able to deal with all aspects for assistance. It was important for those teams not to rely on a single referral source and, in time, referrals were received from agencies such as community health centres, district nurses, welfare staff, schools, early childhood services and so forth. Some non-traditional sources of referral developed, particularly from informal leaders who had an intimate knowledge of their own communities. For example, in one area the local postmaster proved a valuable source of identifying, from the many individuals who discussed their situation with him, those who he believed to require professional counselling and referred them to the team. In the majority of instances his judgement was supported by the team staff.

The major issue facing the teams concerned the level of formality to be adopted when providing a direct clinical service. Most teams decreased their usual level of formality and consultations were provided in temporary homes, meeting places, pubs and other equally unlikely venues. Typically, the client and professional were on first name terms and records were not maintained unless a formal psychiatric referral was necessary. When an office based consultation was required local facilities such as community centres, early childhood agencies, or bush nursing hospitals were used.

The approach of one group provided a strong contrast to the informality of other teams. Essentially, this group established an on site outpatient service, housed in a caravan which bore the title "Stress Counselling Service". It was anticipated that individuals could be seen on an appointment or drop-in basis within the caravan. Few people made an approach to the service and those who did largely presented with requests for practical aid. The implications or the failure of this on site receiving facility will be taken up at a later point in this paper.

Secondary and Tertiary Consultation

Secondary and tertiary consultation to local agencies formed about 60% of the work of the mental health professionals. When the ambivalence of local workers to outside agencies was successfully resolved, productive working relationships developed and also made apparent the significant stress upon local workers. The case consultation format provided a valuable and informal avenue for consultants to give counselling support.

Coordination of Services

The consultative roles of mental health professionals highlighted a need for coordination of the many agencies involved in the psychological component of community recovery. In an attempt to promote the sharing of information and maximise the use of local resources, two teams facilitated the establishment of coordination meetings between local helping agencies. The meetings were convened primarily as an efficient method to provide secondary consultative input, but they served several more indirect but important purposes. In drawing workers together, the meetings encouraged agencies to redress the lack of differentiation of roles and enabled a more comprehensive assessment of community needs. They also provided a forum for the resolution of interagency tensions arising from differences in approach and an opportunity for local workers to discuss the stresses arising from their daily work. The network that developed around health and welfare personnel provided valuable assistance in the planning and integration of approaches to community recovery.

A more informal approach to coordination was adopted by another team where pre-disaster community factions and schisms hampered their work. Sharp conflicts between the local general practitioner and welfare providers disrupted reconstruction planning and threatened to spread into the wider community. Through a low-key approach, liaising between the protagonists, the mental health team assisted in resolving the differences, and encouraged the communication of information that was essential to the planning process.

Debriefing support to Volunteers and Combatants

Apart from two exceptions and the general consultations provided to local health workers, mental health teams overlooked the psychological needs of workers from counter-disaster organisations, particularly the fire fighters and volunteers who worked at the scene. In one case, a mental health team provided assistance in the management of a number of workers who, by the second week, were displaying behaviours described by the "disaster syndrome". Most of these were locals who had been through the fires themselves and had initially taken charge of emergency operations. Although their continued involvement and impaired judgement caused major problems to the delivery of material aid, they were unwilling to relinquish their roles and welfare organisers were reluctant or unable to relieve them of duties. Through the contact made by their early involvement in the relief programme, the mental health team was able to sensitively intervene by encouraging the individual to talk through his experiences, and to take a rest period. In another fire-affected area, the mental health team organised a debriefing evening for fire fighters and their families. Information was presented on the typical stress reactions likely to be experienced in order to stimulate discussion within the group on the personal impact

of events that had been experienced. Although a minimal intervention, the work of this team represented the only formal approach made to disaster combatant personnel involved in the fires of Ash Wednesday.

TOWARDS A CONCEPTUAL MODEL FOR MENTAL HEALTH INTERVENTION

The tendency to "reinvent the wheel" in disaster planning has been commented upon in numerous papers (eg Heffron, 1977b). Twelve months after the fires it was apparent that the path travelled and problems faced by Victoria's mental health services paralleled those described in earlier published accounts of large scale disaster programmes. As such, the experience highlighted directions that must be taken in planning a state-wide disaster capacity.

Victoria's mental health response to Ash Wednesday evolved in the absence of a clearly defined model for intervention. As the services attempted to clarify their roles vis-a-vis other relief agencies, ideological differences about the objectives, nature and scope of disaster relief were brought into sharp focus. A clear rationale for mental health intervention and an established set of principles to guide the interactions of the team with the disaster-affected community were required. Our experience of Ash Wednesday identified four major concepts basic to the planning process.

Community Sanction

The need for community sanction of mental health services, that has been stressed by American workers (Cohen and Ahearn, 1980; Zarle et al, 1974) was keenly felt by Victoria's mental health agencies. Major concern that mental health teams would interfere with community-generated self-recovery emphasized the need for services to have as their primary objective, the support and strengthening of community agencies, and to accept direction from local bodies.

Previous authors have stressed the need for mental health interventions to be tailored in accordance with the particular nature of each individual community, with great sensitivity to local power structures and resource networks (Baisden, 1979; Taylor, Ross & Quarantelli, 1976; Cohen & Ahearn, 1980). The general observation has been made that communities in disaster tend to look to themselves for initial help and direction, rejecting imported services in lieu of more familiar persons and groups (Zarle et al, 1974). Mental health professionals can have been described as at their worst having a tendency to impose themselves as self-designated experts on local communities, and to provide unsolicited advice on the management of disaster-related problems. Efforts to transpose themselves as selfdesignated experts on local communities, and to provide unsolicited advice on the management of disaster-related problems. Efforts to traditional clinical models of mental health service delivery to disaster affected communities have been described as meeting with total failure (Taylor et al 1976).

In Victoria, inadequate attention was paid in the initial phase to the manner by which the teams gained entry to the fire-affected communities. The centralised decision made by the administrators of the State's mental health and welfare organisations, that mental health teams would operate under the authority of the local welfare coordinating body, was administratively convenient, but did not constitute community sanction of the services, nor did it clarify the relative roles of imported mental health teams and local agencies. The convergence of helpers and confusion of responsibilities that characterised the post-impact period made clear that to by-pass these difficulties, mental health services must be built into the disaster planning frameworks developed at the shire and local municipality levels, where debate on models and intervention and acceptance of mental health participation can best occur. Moves are now underway in Victoria to ensure mental health representation at all levels of the State disaster planning process.

Involvement with Outreach Programmes

The value of an outreach approach to disaster affected individuals has been described on many occasions by workers experienced in disaster relief (Heffron, 1977a; Frederick, 1977; Zarle et al, 1974; Howard & Gordon, 1972; Raphael, 1979/80). The central objective of an outreach programme, to take services directly to individuals in an early intervention approach, assumes that many individuals will be in need of assistance, but are unaware of or unable to use the services available (Heffron, 1977a).

The passive stance adopted in the early post-impact phase may have been appropriate in view of our lack of preparation, but is obviously unacceptable as a general principle. The failure of traditional modes of mental health service delivery was also obvious at an early stage. On-site outpatient facilities, reliance upon formal referral and use of mental health terminology have been noted by previous workers to be counter-productive and likely to trigger resistance within a disaster affected population (Heffron, 1977a; Frederick, 1977; Okura, 1975).

Mental health professionals can take a variety of roles within outreach programmes. However, it is both impractical and inappropriate for them to attempt comprehensive primary contact with all the disaster affected. Workers such as Heffron (1977a) and Zarle et al (1974) have stressed the value of using supervised non-professionals for post-disaster outreach. Within their programmes, the mental health team selected, trained and monitored the work of the outreach staff. Victoria's outreach

programme was however initiated independently of mental health staff. Rather than training volunteers in crisis counselling theory, church-affiliated individuals, both Local and external to the disaster area were selected for outreach work on the basis of their personal qualities. The approach had the advantage of strong community sanction, and provided an acceptable point of entry for mental health teams to participate in community-led preventative work.

An attempt by one mental health team to initiate an independent outreach programme caused considerable conflict with a second team operating in the same area, but drawn from a different agency. The former group believed that the referrals coming across from the church outreach programme were somewhat arbitrary, and after preparing their own lists of affected persons, commenced a programme to make direct contact with as many residents as possible. The second agency regarded this approach as too intrusive and disregarding of previous visitations. It was considered that a too obvious presence of mental health services would imply pathology in normal grief and loss reactions. The former group believed the other agency to be too conservatively opposed to an outreach model and to have a too narrow view of mental health needs.

Conflict about planned outreach services also occurred within disaster relief agencies following the Tasmanian bushfires of 1967 (Wettenhall and Power, 1970, and has been discussed by Heffron (1977b). While the inter-agency conflict in the Victorian situation had other causative factors, it served to emphasize the need for mental health professionals to actively participate, in a clearly defined way within future outreach work. Planning must achieve a balance between aggressive outreach services and a respect for community self-healing and avoidance of service convergence. In Victoria, the need for mental health consultative support to the outreach programme has been recognised at State planning levels and all regional mental health units are now required to jointly participate in the development of local outreach plans. Some agencies, including those uninvolved in the Ash Wednesday programme, are well advanced in this activity.

The Value of Multi-Modal Approach

Our experience identified a need for a multi-model approach by the mental health services, that anticipates the variety of - roles required. Cohen and Ahearn (1980) and Raphael (in press) have discussed the diversity of consultative and educational roles that can be performed, but have stressed the need to adapt the services in response to changing needs of the community. While the Victorian teams attempted to develop a range of services, most tended to concentrate on one or two role components, usually the primary or secondary consultative aspects of their work.

Only two of the teams gave detailed consideration to phasing out their services according to need. Withdrawal of those services was not achieved according to pre-determined timetable, but on the disappearance of significant disaster-related needs and demands.

Defining the Disaster Affected Population

An adequate conceptual model of mental health intervention in disaster defines the population potentially in need of services and identifies the specially vulnerable sub-groups. The mistake made in Victoria was one of too narrowly defining the disaster affected population and not developing adequate outreach procedures to take services to high-need target groups. Generally, the services were oriented to those many families and individuals who suffered property losses and who had returned to their burnt-out blocks to rebuild. Apart from specific attention to the needs of children, the special needs of other groups identified as "at risk" by researchers (National Health and Medical Research Council, 1983) were overlooked. Teams were not located at casualty receiving hospitals to deal with burns victims and their relatives. Similarly, efforts were not made to contact the many individuals and families who lost relatives and friends in the fires.

Apart from the approach made by one team to local fire fighters, specific services were not offered to the emergency service organisations involved in combating the fires. In one sense, popular images of "victims" and "helpers" (Short, 1979) prevailed, despite the considerable evidence suggesting that psychological after effects of disaster are present in many workers involved in rescue and recovery operations (Raphael, Singh and Bradbury, 1980; Raphael, Singh, Bradbury and Lambert, 1983/4; Taylor and Frazer, 1982). However, two major strategic problems also impaired service delivery to these groups. The first concerns volume. More than 15,000 Victorian volunteers were directly involved in combating the Ash Wednesday fires, along with hundreds of other emergency service personnel who played vital and, at times, life threatening roles. The second problem relates to the tendency within these organisations, particularly at senior administrative levels, to construe the need for psychological assistance as symptomatic of psychological instability or unsuitability for the work. Careful negotiation with these administrators is required before any offer of assistance would be genuinely accepted.

Since Ash Wednesday, the psychological needs of emergency service personnel have now been acknowledged within the State Disaster Plan, and the principle established that mental health teams active in future disasters should be made equally available to both the direct and the indirect victims of disaster. Following the suggestions of Raphael et al (1983/4), negotiations are underway with the leaders of several of the disaster

combatant organisations to use mental health professionals as consultants for the incorporation of a psychological component into their more usual organisational debriefing framework.

BUILDING AN ORGANISATIONAL FRAMEWORK

The critical importance of the pre-disaster organisational framework in which mental health services are provided was again emphasised by Victoria's recent experience. The lack of an adequate mental health disaster plan did not prevent service provision, as it also did not in the Granville disaster of 1977 (Down, 1983) or the Indiana tornadoes of 1974 (Zarle et al, 1974). However, many problems were created that could have been circumvented by a clear and efficient disaster relief framework. Neither the good intentions nor the competence of individuals in the mental health area are enough to ensure an adequate response. Where there are systemic and organisational weaknesses in plans, they have to be addressed and cannot be overcome by goodwill, ad hoc decision making, dependency upon friendship ties or a hope that abstract professional knowledge will transform itself into meaningful, practical services.

Our recent experiences suggest that these are four priority areas for the development of an adequate counter-disaster framework by providers of mental health services in Australia.

1. There must be adequate mental health representation within the executive structures of the State's disaster coordinating body. As all planning, coordination and training emanate from the State master plan, a strong mental health presence at this level is necessary to integrate mental health programmes with other aspects of disaster relief. Mental health representation is also required to counter the preoccupation often found at this level (Wettenhall and Power, 1970) with combat and rescue issues to the exclusion of longer term aspects of community and individual recovery. Through an involvement in the chain of command, roles and responsibilities of various agencies can be defined, and the work of those agencies coordinated in order to minimise the risk of inter-agency conflicts.
2. Mental health services must be built into the longer term welfare support and community recovery programmes developed at state level. The Victorian experience demonstrated a basic affinity between mental health and welfare organisers in terms of the objectives of their disaster work. Mental health programmes to large scale community disasters are best delivered within a practical welfare context and this does not occur if they are only seen as a specialist sub-component of medical disaster planning.

3. Disaster planning must extend to all mental health agencies within the state network, and not be confined to a specialist, centralised group. Preparedness for disaster in Australia must come to grips with the fact that each year, whole communities are threatened by large scale natural disaster such as flood, fire and cyclones (Carroll, 1977). The centralisation of expertise within a small group of mental health professionals cannot meet the demands that arise from these calamities. An adequate organisational framework for disaster requires that, where there exists a capacity for disaster, relevant mental health teams must be involved in pre-disaster planning. It is therefore necessary to assist each agency in the development of detailed plans, similar to those that have been prepared for community mental health facilities in the United States (eg Heffron, 1981; Meyer, Lewis & Paskeoff, 1980; Cohen & Ahern, 1980). These plans should define roles and responsibilities within the agency, identify tasks to be performed by the team, and provide guidelines in the selection and training of staff. This approach implies that the best starting point for building a mental disaster plan is at the grass roots level.
4. Mental health disaster plans must be flexible and adaptive to meet the unique aspects of each disaster. The tendency to "plan for the last disaster" must be counteracted by an anticipation of the multi-variability of disaster. Disasters which involve widespread destruction of property but only a limited loss of life, have different implications for the roles and functioning of a mental health team from those disasters that threaten or take a large number of lives but have only a minimal welfare component.

The major value of Victoria's experience of Ash Wednesday, from an organisational point of view, has been the acceptance and integration of these principles into disaster planning arrangements. The experience stimulated the growth of awareness of the potential disaster roles within the State network of mental health agencies, and action is underway to assist those agencies in their preparations. The specific objective is to promote the formation of small crisis and disaster teams within each mental health unit, firmly embedded within regional disaster planning networks. State disaster plans have also been amended to allow adequate mental health representation, and to fully integrate mental health agencies within a medical and a welfare context. The challenge now is to maintain the momentum and interest generated by recent events.

DISASTER RESEARCH AND POLICY FORMATION

We will conclude with some comments on the need to bridge the gap that exists between research on human behaviour in disaster

and disaster policy formation.

Commenting on the lack of research into international disaster relief for developing countries, Taylor (1979) has suggested that lack of knowledge is not the prime obstacle in advancing the cause of disaster prevention and mitigation. Rather, the problem is one of applying the knowledge that already exists. A similar observation can be made about human behavioural disaster research. Attention must be given to increasing the impact of research knowledge upon the design and management of disaster relief programmes. To achieve this, a formal link between research and disaster relief workers must be forged. In the recent Victorian experience, disaster researchers and mental health service providers operated independently, and both groups suffered in different ways. From a service provider's point of view, resources were unavailable to mount appropriate research programmes, and many invaluable research opportunities were missed. At the central level, no specific arrangements were made for the collection of data that could be used for evaluation purposes and it is with considerable regret that we are unable to provide any quantitative information on the work and effectiveness of the mental health teams. From the researcher's point of view, a closer link with service providers could allow their research to be built within the health and welfare response, providing it with a certain legitimacy and a channel for advocacy for the research objectives. Such a link would reduce the suspicion and hostility that was directed at research workers and help overcome the logistical problems involved in mounting programmes in the aftermath of disaster. To fantasize a little further, through the cooperation between service providers and researchers, a "standby research capacity" could be developed at a planning level, and readily mobilised at the time of disaster.

The overall goal then, is for research to be regarded as a necessary and integral component of the relief operation. Through this means, research data can be made more accessible to the planners of disaster policies and, in turn, shape the style or services that are provided to the community.

REFERENCES

- Baisden, B. 1979. Social Factors Affecting Mental Health Delivery: The Case of Disasters. In E P Lewis and L D Nelson (Eds), Sociological Research Symposium IX, Richmond, Virginia: Department of Sociology, Virginia, Commonwealth University, 238-241.
- Carroll, B. Disaster Horror and Fear in Australia. Sydney: Basic Books, 1977.
- Cohen, R E and Ahearn, F L. 1980. Handbook of Mental Health Care of Disaster Victims. Baltimore: John Hopkins University Press.
- Down, S. 1983. A Retrospective View of the Granville Rail Disaster. Paper presented at Australian Psychological Society Eighteenth Annual Conference, University of Sydney. Frederick, D J. 1977, Current Thinking About Crisis or Psychological Intervention in United States Disasters. Mass Emergencies, 2, 43-50.
- Frederick, D J . 1977, Current Thinking About Crisis or Psychological Intervention in United States Disasters. Mass Emergencies, 2, 43-50.
- Heffron, E F. 1977. Project Outreach: Crisis Intervention Following Natural Disaster. Journal of Community Psychology. 1977(a), 5, 103-111.
- Heffron, E F. 1977. Interagency Relationships and Conflict in Disaster: The Wilkes-Barre Experience. Mass Emergencies, 1977 (b), 2, 111-119.
- Heffron, E F. 1981. Draft Disaster Plan: Cumberland River Comprehensive Care. Unpublished manuscript.
- Howard, S J and Gordon, N S. 1972. Final Progress Report: Mental Health Intervention in a Major Disaster, National Institute of Mental Health, Small Research Grant MH 21649-01, San Fernando Valley Child Guidance Clinic, Van Nuys, California.
- Meyer, L. Lewis, R and Pasekoff, L (eds) 1980. Disaster Mental Health Planning Workshop. Massachusetts: Research for Social Change.
- National Health and Medical Research Council. The Psychosocial Management of People Involved in Major Disasters. Canberra: Australian Government Publishing Service, 1983.
- Okura, K P 1975. Mobilizing in Response to a Major Disaster. Community Mental Health Journal, 11, 136-144.
- Raphael, B. 1979-80. A Primary Prevention Action Programme: Psychiatric Involvement Following a Major Rail Disaster. Omega, 10, 211-225.

- Raphael, B. Psychiatric Consultancy in Major Disaster. Australian and New Zealand Journal of Psychiatry. (In Press).
- Raphael B, Singh, B and Bradbury, L. 1980. Disaster - The Helper's Perspective Medical Journal of Australia; 2, 445-467.
- Raphael, B. Sing, B Bradbury, L. and Lambert. F. 1983-4. Who Helps the Helpers? The Effects of Disaster on the Rescue Workers. Omega, 14, 9 - 20.
- Short, P. 1979. 'Victims' and 'Helpers'. In R L Heathcote and T G Thom (Eds), Natural Hazards in Australia. Canberra: Australian Academy of Science.
- Tan, E S and Pawsey, R. The Ash Wednesday Experience of Victoria's Mental Health Services. Proceedings of the MHD/RANZCP Ash Wednesday Review Seminar. Melbourne: Victoria Government Printer (In Press).
- Taylor, A J. 1979. Directions for Social Research in Disaster Prevention, Mitigation and Relief. Disasters, 1982. 3, 275-281.
- Taylor, A J W and Fraser, A G. 1982. The Stress of Post-Disaster Body Handling and Victim Identification Work. Journal of Human Stress, Dec. 4-12.
- Taylor, V A, Ross, G A and Quarantelli, E L. 1976. Delivery of Mental Health Services in Disaster: The Xenia Tornado and Some Implications. Columbus: The Disaster Research Center Book and Monograph Series, Ohio State University.
- Tuckman, A J. 1973. Disaster and Mental Health Intervention. Community Mental Health Journal. 9. 151-157.
- Victorian Welfare Displan Executive. 1983. Final Report: Post Impact and Recovery Phases, Victorian Bushfire Disaster February, 1983. Unpublished Report, Department of Community Welfare Services, Victoria.
- Wettenhall, R L and Power, J M. 1970. Bureaucracy and Disaster I: Prelude to the 1967 Tasmanian Bushfires. Public Administration, 29, 165-188.
- Zarle, T H Hartsough, D M and Ottinger, D R. 1974. Tornado Recovery: The Development of Professional - Paraprofessional Response to a Disaster. Journal of Community Psychology, 2, 311-321.

ASSESSMENT OF THE BUSHFIRE RELIEF UNIT

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INTRODUCTION

Following the bushfires in South Australia on Wednesday the 16th February 1983, the State Government developed the unique approach for the provision of assistance to the disaster victims. Three distinct areas were devastated in the fires, these being the Clare Valley, the lower south east and the Adelaide hills. The extent of the need for relief was substantial. 28 lives were lost and 385 homes were destroyed or seriously damaged. 3,200 properties were damaged and 208,400 hectares of land were burnt. 2,960 registrations were recorded by the Red Cross representing 7,271 people. A team was rapidly recruited to act as the only group within the Welfare Service sector who would handle the needs of the bushfire victims. Approximately half came from a social work background and the others were individuals with counselling skills selected on the basis of their appropriateness for the task. The unit was under the direction of an executive officer and support was provided by an additional 9 staff. By concentrating their expertise and knowledge, it was hoped that many of the problems that have occurred after the previous Ash Wednesday bushfires in South Australia in 1980, could be circumvented. This included assisting with the rapid settlement of insurance claims, minimising bureaucratic delays by providing accurate and up to date information, the facilitation of rebuilding and assisting with the psychological well being of those who were bereaved or injured. It was originally hoped that contact would be made with every person who was a bushfire victim in the early days after the fire and to ascertain the needs of the disaster affected population. In the early days after the fire this was a difficult task because many of those affected refused to leave their properties or to register for assistance. A total of approximately 2,000 initial contacts were made.

The team functioned for a period of six months and was responsible for the distribution of all the grants and donations that were given to the bushfire victims. The nature of the grants reflected a balance between attempting to assist those who had suffered immediate hardship as a result of the fire, had been relocated or had experienced property loss and damage. The need for compensation of the bereaved and the disfigured were also taken into account in the provision of grants. A grant of a thousand dollars was also made for the funerals of those killed. A total of 1,717 grants were made for immediate hardship and 1,772 for property damage, 1,236 families receiving both types of grant. When the unit wound up its activities a total of only 50 families were passed on to the Department for Welfare for further assistance.

The number of personnel and resources available to the bushfire relief unit were substantial. However, this may not be the case in disasters where larger populations are affected and many of those who provide welfare services are themselves victims of the disaster.

If welfare services were limited after a major disaster, it would be important to create priorities so that services could be directed to essential areas. A review of the literature failed to identify any systematic audit of disaster welfare services that allowed the drawing of objective conclusions. A number of anecdotal accounts of welfare services in disasters, however, exist. Raphael and Singh on the other hand have attempted to analyse the effectiveness of the provision of psychiatric services in a disaster setting. In assessing the effectiveness of welfare services it seemed that several issues required analysis. In the past, social workers have been seen to have a dual function of providing counselling and assisting with the provision of welfare. There has been a recent move to pursuing the idea of community social work. In the disaster setting it is an important question as to whether the physical needs of the population can or are appropriately distinguishable from their psychological needs. It seemed the bushfire relief unit provided an ideal opportunity to assess some of these issues because the members of the team were aiming to see all of those people who were victims of the disaster. This question could be assessed in two ways. Firstly, by asking the individual bushfire relief workers what they saw as their important roles and secondly to ask them to define the predictors of physical need and psychological risk factors in the victims.

In the circumstances where disaster relief services are insufficient, it is important that high risk groups who need assistance can be defined so that the limited resources available are directed towards those most in need. The crisis intervention model would suggest (Maddison) that in any crisis situation several groups exist. Firstly, there is a group who will be able to weather the crisis and have a good outcome with little or no intervention. Obviously this group does not require assistance. The group that it is important to define as those who would have a bad outcome with no intervention but whose long term well being can be brought up to the level of good outcome group with an appropriate programme of assistance. Finally, there will be a group who will have a bad outcome independent of whether services are provided or not. In other words, the outcome of this group is unable to be changed by the provision of services. This group provides the greatest ethical dilemma to disasters workers and their humanitarian needs should not be forgotten. Disaster research (Kinston and Rosser, Chapman) has indicated that certain groups are at risk of psychological disorder following major disaster. These include children between the ages of 8 and 12, the elderly and those who have an extreme exposure during the impact phase. Although it would seem common sense that those who lose the most are in need of greater assistance after a disaster, this assumption fails to take into account the fact that in such

circumstances some people prefer to maintain their independence. The study into the primary school children in the south east of South Australia identified that 10.9% of those who would have been eligible for relief chose not to request it. Also, in part, people's needs for physical assistance will be determined by their degree of emotional distress following the disaster because this may significantly interfere with their ability to manage their affairs satisfactorily. The careful definition of risk factors for the provision of physical relief is therefore necessary.

Finally, although much descriptive information exists about the nature of psychological problems observed in disaster affected populations, little data exists about how such problems are managed or dealt with. For those designing disaster services, such questions are very important. Many disaster workers have a social work background and although trained in counselling fields do not have specific training in the recognition or diagnosis of psychiatric disorders. It therefore needs to be assessed whether such people are able to distinguish the more prevalent non specific distress among disaster victims from psychiatric morbidity and refer appropriately. There is the obvious potential for professional rivalry to surface between mental health professionals and social workers in the disaster setting as part of the more general convergence phenomena.

AIMS

On the basis of this general background, a number of aims were formulated. These included:-

1. What roles were seen to be important by the bushfire relief workers?
2. How well trained did the members of the team feel they were for these tasks?
3. Which role did the team members believe they performed effectively?
4. Which roles did the team find stressful?
5. What characterised those most in need of practical assistance?
6. What characterised those at risk of emotional disorder?
7. How were those emotional disorders managed by the team?
8. What were the individual stresses involved for the relief workers and how did they deal with this aspect of their work?

METHODOLOGY

A nineteen page questionnaire was developed with Professor Raphael predominantly using visual analogue scales that were divided into ten point scales. A preliminary draft of the questionnaire was discussed with one of the senior bushfire relief unit members to ensure that the items included were both suitable and appropriate.

Three general areas were covered in the questionnaire, these being the roles of the worker, observations made about the victims and the personal effects of the disaster on the relief workers. As well as requesting specific information about areas such as previous disaster work, the number of victims seen, other agencies used etc., the questionnaire included eleven scales one of which was the twelve item version of the General Health Questionnaire.

Once the questionnaires were returned, the members of the team were given a structured interview by Dr Mary Frost. This interview was used to enlarge on some of the areas covered in the questionnaire as well as attempting to collect missing data from the questionnaires. One worker refused to be interviewed and the two co-ordinators of the regional team were also interviewed.

RESULTS

The relief workers were asked to rank each of the fourteen items described on Table 1 on three ten point visual analogue scales. The first one enquired about what they saw as their most important role. The roles were then ranked according to their means. The most important role was being someone for the victim to talk to about the disaster, the second was being able to direct people to the appropriate agencies to deal with their problems and the third equal were providing emotional support and arranging financial relief and aid for victims. These first items indicate the general trend noted for the other items, namely that there is a mixture between practical and psychological tasks. It seems that the relief workers saw their welfare and counselling role as being equally important. This suggests that training and expertise in both of these areas are important prerequisites for selection to such a team.

When looking at the way the workers assessed their training for these various tasks, the ranking was similar to the order obtained when the tasks were ranked according to importance. It seemed that they felt well trained to arrange for the financial relief and aid for the victims and that their counselling skills were generally adequate. This would suggest that the members of the team saw that their training, generally speaking, corresponded to the tasks they perceived as being important.

The workers were then asked to score what they believed was their effectiveness in these various roles. Again they perceived they were very effective in their role acting as a person for the victims to talk to about the disaster, this being ranked

number one. When the general ranking of items was compared to the other scales, there was a higher degree of concordance. Therefore, in summary it seems that the workers felt that they were effective in the areas they perceived to be of a high priority and that their training had adequately prepared them for these functions.

However, when the significance of the ranking is tested using mean and standard deviations, the statistical differences are poor. This suggests that differentiation of the tasks into important and unimportant roles by the workers was not very clear. For example the most important role was ranked with a mean of 9.3 and the ninth most important ranked with a mean of 7.1. It seems that there was the potential danger of the workers not developing an adequate assessment of priorities in their work. This suggests that it would have been important for supervisors to provide a sense of priorities. Similarly, unless the co-ordinators of the team have an idea of these priorities when selecting team members, that they will not match individuals training to the perceived task.

When looking at the range of responses on the individual items there was a considerable scatter. For example, when asking about the importance of providing grief therapy for those who lost property or relatives this was given a value from 0 to 10. Similarly assisting in practical tasks was valued from 0 to 10. This suggests the workers approach their job in very individual ways and raises the question as to whether an adequate job specification existed. Several of the workers felt that they had not been given an adequate brief prior to going into the field.

Finally, the range of scores on the three scales for individual workers were substantial as indicated on the table. This suggests some workers either took an exaggeratedly optimistic view or pessimistic view of their effectiveness or the importance of their various roles. The stressfulness of disaster work means that a variety of strategies can be used by relief workers to protect themselves from the enormity of the task. Such a setting provides a very real possibility that some people will protect themselves from the stress by overestimating their effectiveness. This suggests that continual auditing of relief workers in the field may play an important role. Furthermore, if this does not occur it seems that if the work is left to the individual, the service that they provide to the victims may in fact be quite different. The skills that the individual brings to the work are likely to play a major role in determining their priorities and this needs to be taken into account when selecting such a team.

Difficulty of Tasks

The next question asked the workers to outline the areas they found difficult in their work. Having to deal with bureaucratic slowness and decision making was the most difficult task. Although one of the specific briefs of the team was to minimise

the intrusion of bureaucracy in providing of relief, it was still an important problem. The relief workers found assisting those who had lost relatives was the second most difficult task, suggesting that specific skills and experience in having dealt with bereaved are very important for disaster workers. The third most difficult task was terminating contact with the victims. One of the most complex psychological tasks for a bushfire relief worker is neither to over nor underestimate the needs of the victims. Closely identifying with their situation can make it difficult for the workers to leave people to their own resources. It is important for this reason that such teams be trained in being able to make an accurate assessment of those with whom they can readily relinquish their contact.

Risk Factors

The relief workers were then asked to define who they thought were the high risk groups requiring physical assistance after the disaster. The high risk groups were those who had lost their livelihood and or home. Those who had lost relatives or had a past psychiatric history were also defined as being in need of practical help. When looking at those who were at risk over emotional distress, those with a past psychiatric history were identified as being the most vulnerable followed by those who had lost a relative or their homes. Again there was a fairly close ranking between the predictors of physical need and emotional distress indicating that these two phenomena are closely intertwined. A person's ability to deal with their practical loss and re-establishment of themselves will be largely dependent upon their premorbid coping ability and the meaning of the loss to them. It is interesting to note that social class, being unemployed and previous contact with welfare services were poor predictors, of people's needs. It is notable that the relief teams largely focused on the factors relating to the event as predictors of need. They also tended to rank people's risk generally as being very high. For example, the mean for the first six items on both scales was 8 or above. This suggests that the workers see a large number of people as being at extreme risk in the disaster setting. Again when attempting to statistically validate the ranking as being significant; this was difficult to achieve. This tends to suggest that the relief team perceived the needs of the population both for physical relief and emotional counselling as being extreme. Thus they perhaps tended to exaggerate the vulnerability of the population.

This has several important ramifications. Firstly, it raises the possibility that the relief workers were not able to define who was most likely to benefit from their intervention except according to the magnitude of loss. This seems to take little account of people's premorbid personality and other resources. It is an intriguing indication of how people tend to exaggerate the role that life events play in the onset of psychiatric and physical illness. Secondly, the predictors of emotional distress

defined by the bushfire relief team do not strongly correlate populations, indicating the importance of differentiating non-specific symptoms in disaster affected populations from those who do develop psychiatric illness. Thirdly, the workers may cope with the demands of the job by exaggerating the helplessness of the victims. This suggestion is supported by the presence of a strong negative correlation between the ease of the task and the assessed risk of the victim at a level of $p = .000$. In this way the relief workers protect themselves by seeing people being in need of their assistance. Finally, although some of the workers saw the definition of risk groups as labelling victims and hence stigmatising them, they perceived the vulnerability of the population as greater than that suggested by psychiatric researchers into the disaster. As a result of their training these workers wish to see the fire and the services required in terms of group and social action. One problem that arose out of this approach was the ambiguity it created for workers in acknowledging individual problems which led to a reluctance to accept that some people were suffering from major psychiatric disorders that they did not have the expertise to treat.

CONCLUSIONS

In this preliminary analysis of the data from this study a number of conclusions can be drawn. Firstly, it is important that a detailed job specification be drawn up for disaster relief teams. Most of the disasters likely to be experienced in Australia are predictable. These specifications should therefore be drawn up in advance so that they can be brought quickly into action as the need requires. Secondly, it is important that the criteria for selection be based on matching the priorities of the group with the training required for team members. Thirdly, it is imperative that disaster plans incorporate the central philosophy of the crisis intervention by defining risk groups who are particularly likely to benefit from assistance. In a major catastrophe this would at least allow the workers some chance of ordering their priorities appropriately. Left to their individual devices, the workers may define idiosyncratic risk groups. This points to the importance of continuing supervision and support for workers in the field and to assess whether they are fulfilling the defined priority of the disaster relief plan. It is also equally important to find whether these workers have been able to identify previously undescribed risk groups. Fifthly, to this end it is vital that disaster workers keep at least some records. This would assist with the development of future disaster plans and it is essential that some form of external audit occur once the crisis has passed. Half the team were unable to tell us how many victims they had seen in the course of the six months work. It seems that there is perhaps some need of members of the disaster team to underestimate the ability for people to cope without help. This may have reflected in their difficulty in terminating their contact with the victims. Thus supervision and training in this general area is likely to be important for

future disaster teams. Finally, it is necessary to incorporate psychiatrically trained staff into the team who have regular face to face contact with the workers. A very small number of referrals were received from the team and a number of subsequent patients I have seen felt that some members of the bushfire relief team underestimated the severity of their suffering, wishing not to see it as a psychiatric disorder.

All in all the bushfire relief team felt satisfied with the job they had done and to all accounts seemed to have dealt with the practical and counselling needs of the affected population appropriately. The absence of any major criticism in the media suggests that they worked with thoroughness and diplomacy.

REFERENCES

1. RAPHAEL B, SINGH B. AND BRADBURY L (1980) DISASTER - THE HELPER'S PERSPECTIVE, MEDICAL JOURNAL OF AUSTRALIA 2, 445-447.
2. MADDISON D (1967) EPIDEMIOLOGY AND AFTER - THE IMPLICATIONS OF CRISIS STUDIES. PAPER PRESENTED AT SYMPOSIUM ON "PSYCHIATRY AND THE COMMUNITY" SYDNEY.
3. KINSTON W AND ROSSER R (1974) DISASTER: EFFECTS ON MENTAL AND PHYSICAL STATE, JOURNAL OF PSYCHOSOMATIC RESEARCH 18: 437-456.
4. CHAMBERLAIN B C (1980) MAYO SEMINARS IN PSYCHIATRY: THE PSYCHOLOGICAL AFTERMATH OF DISASTER, JOURNAL OF CLINICAL PSYCHIATRY 41:7,238-244
5. MCFARLANE A C UNPUBLISHED RESEARCH

TABLE 1

ROLES

TASKS	IMPORTANCE RANK	TRAINING RANK	EFFECTIVENESS RANK
SOMEONE TO TALK TO	1	1=	1
REFERRAL TO AGENCIES	2	4	3
EMOTIONAL SUPPORT	3=	3	5
FINANCIAL AID	3=	1=	2
NEGOTIATING WITH GOVERNMENT	5	5	4
GRIEF THERAPY	6=	6=	8
COMMUNITY ORGANISATIONS	6=	10	6=
RESOURCE FOR OTHER WORKERS	8	8=	6=
INFORMATION RE REACTIONS	9	6=	9
ADVOCATE IN COMMUNITY	10	8=	9
ASSESSMENT OF LOSS	11	13	12
NEGOTIATING WITH PRIVATE CO	12	11	11
LEGAL INFORMATION	13	14	13
PRACTICAL TASKS	14	12	14

RISK FACTORS - TABLE 2

	EMOTIONAL (DISTRESS (PROBLEMS	NEED OF ASSISTANCE
	RANK	RANK
PAST PSYCHIATRIC HISTORY	1	3=
LOST RELATIVE	2=	3=
LOST HOME	2=	2
LOST LIVELIHOOD	4	1
RECENT LIFE EVENTS	5	9=
PRE-EXISTING MARITAL DIFFICULTIES	6	11
SOCIALLY ISOLATED	7=	5
RELOCATED	7=	6=
HIGH EXPOSURE	9	8
INJURY	10	6=
PERSONALITY DISORDER	11	14
AGE 40-60	12	13
RECENTLY MOVED TO AREA	13	15=
AGE 60+	14=	9=
DEPENDENT CHILDREN <14	14=	15=
SOCIAL CLASS 2	16	

POOR PREDICTORS

SOCIAL CLASS

UNEMPLOYMENT

MIGRANT STATUS

SEX

PREVIOUS CONTACT WITH WELFARE SERVICES

PHYSICAL ILLNESS

DIFFICULTY OF TASKS

1. BUREAUCRATIC SLOWNESS AND DECISION MAKING
2. DEALING WITH THE PERSONALLY BEREAVED
3. TERMINATING CONTACT WITH VICTIMS
4. ARGUING VICTIMS CASE WITH AN ANTAGONISTIC BODY
5. DEALING WITH THOSE WHO SHUNNED ASSISTANCE BUT
OBVIOUSLY NEEDED HELP
6. FACING YOUR PERSONAL FEELINGS ABOUT THE VICTIMS
7. WORKING WITH OTHER GOVERNMENT DEPARTMENTS
8. DEALING WITH DEMANDING VICTIMS
9. APPROACHING VICTIMS ON THE 1ST OCCASION
10. DEALING WITH THOSE WHO LOST PROPERTY
11. COPING WITH DEMANDS OF SUPERIORS
12. WORKING WITH OTHER MEMBERS OF THE TEAM

WELFARE POLICY AND DISASTERS*

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INTRODUCTION

In Australia, disasters annually threaten a cross section of the population. Voluntary and government agencies respond at different levels depending on the magnitude of the impact. The Natural Disasters Organisation and voluntary agencies have responsibility at the national level for the welfare of disaster victims. At State level the response is co-ordinated by the State and Territory Emergency Services and voluntary and government welfare agencies participate under their leadership. An important element in the immediate disaster phase is the informal and spontaneous response by victims, friends, neighbours and strangers from within community.

Four major events in the last two decades have led to a concentrated research effort into the social and psychological effects of disasters in Australia: the Tasmanian Bushfires 1967 (1); the Brisbane Floods 1974 (2); the Darwin Cyclone 1974 (3); and the Ash Wednesday Bushfires in South Australia and Victoria 1983 (4).

Studies on the welfare needs of disaster victims are found in other western countries and include research by the Disaster Research Center and the Natural Hazards Research and Applications Centre in the United States of America and the International Disaster Institute in London.

The Disaster Research Center studied organisational response to disasters but there has been criticism of the application of sociological findings to disaster policy in the United States. White and Haas 1974 suggest that the social scientists had little or no effect on policy.

While the disaster literature has generally focused on the consequences of discrete events little attention has been paid to the ongoing development of policy for disaster welfare services in Australia. This reflects a similar trend in other countries. There are few published studies on disaster welfare services in Britain, the United States of America, Canada, or New Zealand. In surveying over 2,000 studies of disaster 1920-1980 only a few items on welfare were found (5).

* A related paper based on the same data has been accepted for publication in DISASTERS early in 1985.

DEFINITION OF DISASTER

For the purpose of this study a disaster is defined as an event creating overwhelming physical, social and psychological consequences for a group of people and requiring the special mobilisation and organisation of services.

The definition used in this study has the boundary of short term responses which matches the primary concern of the State and Territory Emergency Services. Disaster welfare services are co-ordinated by the State and Territory Emergency Services with State Disaster Plans. The longer term welfare response which follows the immediate response is continued by existing welfare services without the special structure and administration used in the immediate disaster phase.

Disaster is a word with many meanings and the perception of a disaster varies between agencies, professions and even the victims. Some of the differences can be explained in legislation (Krimgold 1974) which may cover emergency actions, aid giving organisations or the development of some public understanding of an event. Foster (1976) uses 'magnitude' as the basis for a disaster and this is a common basis for many service organisations.

The Red Cross which is an international voluntary agency with a long history of disaster relief defines a "catastrophic situation" in which day to day patterns of life are suddenly disrupted, people are plunged into helplessness and suffering and need protection, food, clothing, shelter, medical care and other necessities of life. (Ward 1975).

Oliver (1974) says that a natural hazard greatly exceeds normal expectations in terms of its magnitude or frequency and causes major hardships with significant material damage to man and his works and possible loss of life.

A definition by police in England (City of London Police 1974) is:

'a serious disruption of life arising with little or no warning, causing or threatening to cause death or injury to numbers of people in excess of those which can be dealt with by the public services operating under normal conditions and requiring the special mobilisation and organisation of those services.'

Similarly a hospital views a disaster as an incident when it is impossible to manage without calling in off-duty staff, clearing wards, mounting reserve equipment and perhaps directing casualties to other hospitals. (City of London Police 1974).

An early definition used by the Australian National Emergency Services College (1975) describes the effects of disasters on the individual and the community as: injury and death, damage to property, disruption of lifestyle, loss of livelihood, and disruption of services.

Social Science definitions focus on social disruption and frequently use a systems format. A definition commonly used by sociologists describes disasters as affecting a community of persons, confronting a large segment of the community with danger or threats, resulting in deaths, injuries, destruction of property and losses and deprivations to the population with direct and indirect consequences affecting a large proportion of the population. (Cisin and Clark 1962)

In studies of the Tasmanian Bushfires and the Brisbane Floods (Chamberlain et al 1981, 1981a, Wettenhall 1975) sociological definitions used in United States literature were adopted as appropriate to Australian disasters. Innes Reid (1979) describes natural disasters in terms of disastrous effects on human settlements. She identifies differential effects on the population in any given community where there are identifiable groups of vulnerable persons (the very young, very old, frail, infirm, handicapped, dependent, confused, psychologically unstable, people who have difficulty coping in normal circumstances), and economic victims.

In a paper presented at an NDO seminar in June 1980, Chamberlain defined disaster in the following terms:

"... natural disasters in Australia (are) more particularly those caused by bushfires, cyclones, drought, hail and flood. However, other non-natural events such as the Tasmanian bridge collapse in 1975 and the Granville train disaster of 1977 may be included for consideration if the dimensions as to death and injury, destruction of property and possessions, loss and bereavement are sufficiently impactful. Personal and material loss, the disruption of familiar patterns of behaviour and of normal social processes occur and require resources at the same time as the more general disruption of community services reduce resource availability." (Chamberlain 1982)

Pertinent to this study she points out that in analysing the welfare experience in disasters both sides of the equation, welfare needs on the one hand and the welfare input on the other, require attention.

The literature study of disasters in western countries provides evidence of the strength and capacity of victims for rescue, and other forms of assistance immediately after a disaster (6).

The importance of the self help response for recovery is underlined in the psychological studies of post disaster effects. Wolfenstein (1957) discussed the concept of vulnerability where the victim feels helpless and vulnerable to further loss following the impact of a disaster. The main psychological symptoms after a disaster arise from depression and anxiety, commonly termed the Disaster Syndrome (Leivesley 1984).

The Emergency Services and other agencies recognise that the facilitation of self help is a key role in Disaster planning and response. Self help is one of the important natural recovery responses which allows victims to overcome feelings of helplessness and vulnerability and to regain control over the environment. The facilitation of self help is therefore a significant part of the welfare role in disasters.

Theoretical issues which have been given attention in the literature (Chamberlain 1980, Short 1976) include alternative conceptualisations of the welfare response to disaster which emanate from rival paradigms: the adaptive and the developmental. The former assumes that disaster-affected persons are victims, requiring services to adapt to changed circumstances. The latter assumes that the crisis can be used to develop new social structures which coincidentally foster personal growth. Some of the dimensions on which the paradigms differ are: central control versus ad hoc and local responses; organisational management versus informality; professionalism versus social networks. The policy implications of the former paradigm are to channel funds for the delivery of services to victims through established organisations; or the latter to use funds to support participation of disaster affected persons in identifying their needs and developing programs.

The welfare response to disasters reflects the principles of the overall welfare system in a society. In general terms, welfare refers to the personal and social circumstances of individuals, groups and communities and has value implications: such as that the personal and social circumstances of all individuals and minority groups are important for the community as a whole, and that the personal and social circumstances of all members of the community should approach equality, or, at least, that there are desirable minimum living conditions which should be guaranteed for all. Such values influence attitudes towards the provision of resources to particular groups in the community.

For example in the absence of the values mentioned above, welfare provisions for the unemployed or aged will at best be grudging or judgmental. Similarly when a disaster generates a group of disadvantaged persons government and perhaps other assistance is likely to be slow to eventuate, inadequate and distributed on the basis of some criterion of merit rather than as a right or on the basis of need.

The short term welfare needs of victims of disasters are a function of relative loss from the impact. This presents the welfare services with a cross-section of the population who are quite different to the normal welfare client group. Immediate needs of victims include psychological, financial and material assistance.

The value position adopted in this study is that resources should be promptly available for disaster affected persons, adequate and fairly distributed.

AIMS

The main aim of this study is to evaluate the policies of disaster welfare services in Australia. It is hypothesised that the dimensions on which these issues differ include central control versus ad hoc and local responses; organisational management versus informality; professionalism versus social networks.

The objective of this analysis is to provide a model for policy decisions by welfare services at Federal, State and voluntary levels.

METHODS

An evaluation model based on five Indicators was used to structure a questionnaire for disaster welfare agencies:

1. Breadth of Disaster Services
2. Growth of Disaster Services
3. Internal Agency Response
4. Goal Achievement
5. Cost Effectiveness

The questionnaire was administered to all State and Territory Emergency Service Organisations for completion and distribution by each central agency to five welfare services.

The Indicators used in this study have been previously developed to evaluate other types of welfare programs (Leivesley 1983, 1984).

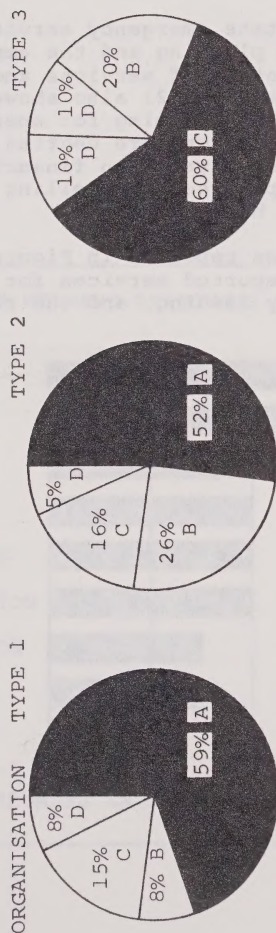
The evaluation of programmes has been well established in the United States (7) and in Australia within the last two decades (8). However welfare studies provide difficulties in evaluation research because of the degree to which unexpected outcomes and subjective responses dominate research findings. Studies in the United States have accepted qualitative information (Sheldon and Freeman 1970) for Social Indicators. The issue of goal achievement has also been debated in many different evaluation studies (9). The needs of the recipients of any service is another area of debate in evaluation studies (Bush and Gordon 1978, Senate Standing Committee 1979) and in the present study the indicators concentrate on numbers of victims and the breadth of the welfare services.

INDICATOR 1 BREADTH OF DISASTER SERVICES

Breadth of services identifies the degree to which the welfare services meet the needs of victims. The Questionnaire asked for a list of the planned disaster services and examples of two disasters and services provided by the agency in each incident.

The responses by 21 welfare services are shown in Figures 1 and 2. The welfare services who responded represented all but one of the 5 States and both the Australian Capital Territory and the Northern Territory. The services are divided into three types of organisation: Type 1, which is the State or Territory Emergency Service, Type 2, welfare agencies within the State Governments, and Type 3, the voluntary agencies.

FIGURE 1: PLANNING DISASTER WELFARE SERVICES



LEGEND:
 A. PLANNING
 B. FINANCE
 C. COUNSELLING
 D. MATERIAL RESOURCES

Figure I, Planned Disaster Welfare Services, represents the four services which were commonly reported by all types of welfare agency - A. PLANNING which represents welfare centres, task groups, provision for co-ordination between services, training and manuals; B. FINANCE to assist victims; C. COUNSELLING; D. MATERIAL RESOURCES which refers to resources for the agency response including volunteers and staff.

Figure I shows that the state emergency services welfare component concentrates on planning and the emphasis in the responses was on co-ordination of services and training. The state welfare services (Type 2) also showed an emphasis on planning and included the planning for special needs groups and the preparation of welfare centres for victims. These agencies placed high priority on financial assistance. The voluntary agencies emphasised counselling services for the victims and financial help.

In addition to the services reported in Figure I, the voluntary agencies also reported services for clothing and household goods, temporary feeding, and the registration and tracing of victims.



FIGURE 2

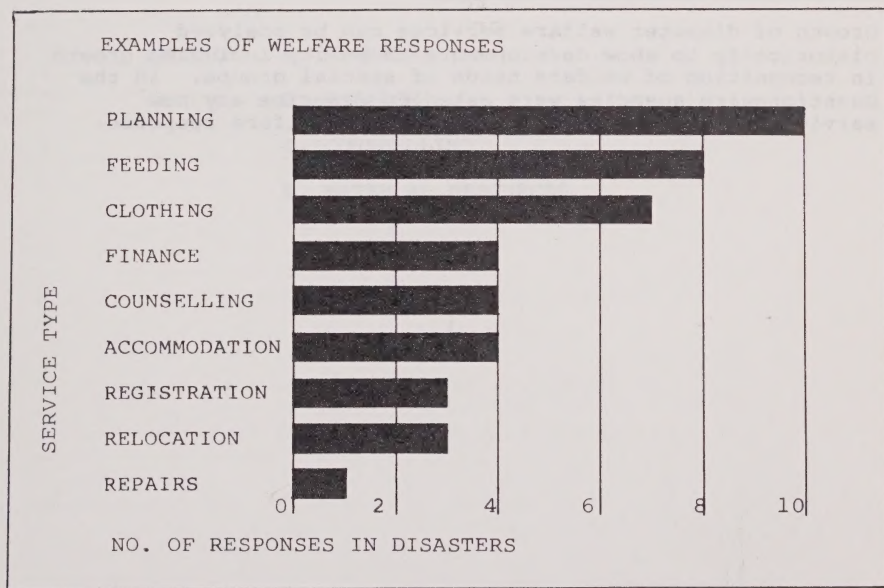
WELFARE RESPONSE TO DISASTERS

Figure 2 'Welfare Response to Disasters' represents examples of welfare services given by the agencies in disasters throughout Australia 1981-1984. Each agency was asked to report on two disaster examples. Eleven agencies were able to give examples and the analysis represents their responses to a total of twenty one disasters. These responses come from three state emergency services, three state welfare services and five voluntary agencies. The responses show an emphasis on planning which includes co-ordination between services, and provision of welfare centres. Practical services of feeding, and clothing were also important in the disasters. Other services included: counselling; accommodation; registration, tracing and inquiries; relocation; and repairs.

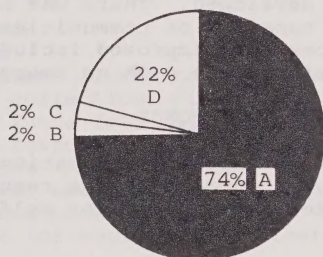
Figures 1 and 2 show that the welfare agencies in Australia are paying attention to co-ordination and interservice liaison. Figure 2 suggests that the practical material assistance to the victims has high priority.

INDICATOR 2 GROWTH OF SERVICES

Growth of disaster welfare services can be analysed historically to show developments in policy including growth in recognition of welfare needs of special groups. In the Questionnaire agencies were asked to describe any new services or increased capacity in their welfare response.

FIGURE 3.

GROWTH IN WELFARE SERVICES



- LEGEND:
- A. PLANNING
 - B. FINANCE
 - C. COUNSELLING
 - D. MATERIAL RESOURCES

Thirteen agencies responded positively to this question (five voluntary agencies, three state emergency services and three state welfare services). Figure 3 'Growth in Welfare Services' shows that planning was the most significant growth area. This covered the development of co-ordination of welfare support, mobile vans and other welfare centre facilities, and recognition of special needs groups including the aged, sick, pregnant women and Aborigines. Communications and training were also developed. There was a move also towards increasing the capacity of communities for self help. Material resources were improved including voluntary and paid staff and physical aids such as emergency trailers.

INDICATOR 3 INTERNAL AGENCY RESPONSE

This Indicator required an internal evaluation of welfare services by members of the agencies. The results are presented in Table I 'Recommendations for Welfare Services'.

TABLE IRECOMMENDATIONS FOR WELFARE SERVICESTYPE I: STATE AND TERRITORY EMERGENCY SERVICES

Advisory committees
 Briefing sessions
 Central welfare plans linked to all levels
 Co-ordination of collection, disbursement of funds, materials
 Co-ordination of funds from all levels in Australia
 Co-ordination of response within normal institutions' roles
 Debriefing sessions
 Deployment to cover needs at the site and operations areas
 Duplication in volunteers avoided
 Employers support for employee volunteers' welfare role
 Evaluation
 Interagency liaison
 Liaison at all service levels
 Local response
 Logistical support
 Monitoring
 Outreach programmes
 Priority to assessing needs
 Registration by computer
 School facilities and principals to be involved
 Self help response to be expanded
 Special group needs
 Training at local level increased
 Welfare agency capacity for response developed

TYPE 2: STATE GOVERNMENT WELFARE SERVICE

Co-ordination statutory and voluntary agencies
 Federal and state co-operation for resources
 Federal and state increase in welfare services
 Immediate response
 Implement Report, Working Party on Counter Disaster Welfare
 Reassessment non statutory capability so no overcommitment
 Statutory authorities to plan, implement, co-ordinate responses
 Welfare involvement in planning
 Welfare involvement in training

TYPE 3: VOLUNTARY AGENCY

Co-ordination voluntary plans state welfare personnel
 Government funding to voluntary agencies
 Government welfare agencies to increase personal services
 Liaison all government and voluntary agencies on resources
 Public Education
 Re-examination of agencies' contributions in disasters
 Registration and inquiry system compatible national system

The recommendations are presented under each type of agency. The responses reflect each agency's experience in the disaster field and are showing areas in disaster welfare that could be developed by other agencies, or recommendations for new services.

The state emergency services present a number of suggestions for co-ordination in planning and funding and other planned areas such as logistical support, local training and expanding self help. The government welfare services recommend more co-ordination between the agencies and Federal and State government, and increased welfare involvement in planning and training.

Voluntary agencies focus more on material resource development. Both the voluntary agencies and the state emergency services mention the use of computer assisted registration.

DISCUSSION

The findings of this study relate more to the development of a method of Indicators for welfare policy than actual results. Although five Indicators were tested the responses provided information on three of the Indicators and details of the other two Indicators would not be adequate without further information gathering.

The 21 agencies that replied to the questionnaire were not a random sample and their answers are not representative of all welfare services that are prepared for disasters. However, the information contained in the three graphs and one table shows that there is some national concern for planning of welfare services, that there has been significant growth in some of the agencies' capacity to plan for and respond to disasters, and that there are many recommendations for increased welfare services.

The three Indicators that have been tested in the analysis provide a model for more detailed welfare policy evaluation. This includes evaluation at national levels of the breadth and growth in disaster services and the evaluation of agency response to discrete events. With more detailed examination of the welfare agencies the two remaining Indicators, Goal Achievement and Cost can be added to provide a flexible model for future policy development.

NOTES

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1. TASMANIAN BUSHFIRES: Wettenhall 1969, 1975, Power and Wettenhall 1970, Leivesley 1981.
2. BRISBANE FLOODS: Australian Association of Social Workers 1974, Buchanan 1976, Chamberlain et al 1981, Heatherwick and Quinnell 1974, Indooroopilly Flood Advisory Service 1974, Irish and Falconer 1976, Leivesley 1977, 1981, Price 1978. Queensland Disaster Welfare Committee 1974, 1976, Short 1976.
3. DARWIN CYCLONE: Australian Association of Social Workers 1975, Chamberlain et al 1981a, Darwin Disaster Welfare Council 1976, Degotardi and Grant 1975, Department of Social Security 1975, Gurd et al 1975, Haas et al 1976, Leivesley 1981, Milne 1977, 1977a, National Emergency Services College 1976, Natural Disasters Organisation 1975, Parker 1975, Webber 1976, Western and Milne 1976.
4. ASH WEDNESDAY BUSHFIRES: Bardsley et al 1983.
5. LITERATURE SURVEY OF WELFARE RESPONSE TO DISASTERS: Adams 1970, Birnbaum et al 1973, Bondy 1957, Bunker 1957, Burlison 1977, Cuny and Weesner 1976, Davies 1975, 1976, 1977, De Witt Smith 1957, Heffron 1977, McLuckie 1975, Martin 1974, Meads 1977, Moore 1957, Murphy 1971, Peterson 1957, Prince 1920, Pritchard 1977, Quarantelli and Dynes 1976, Rivers 1978, Ross 1969, Stoddard 1969, Wenger and Parr 1969, Wilkinson 1977.
6. LITERATURE SURVEY OF SELF HELP BY VICTIMS: Austin 1967, Barton 1962, Carr 1932, Douty 1972, Drabek and Quarantelli 1967, Dynes and Quarantelli 1975, Dynes and Wenger 1971, Erikson 1976, Form and Loomis 1956, Fritz and Mathewson 1957, Leivesley 1977, 1977a, 1977b, 1977c, 1978, 1980, Parr 1976, Short 1976, Stallings 1973, Wenger and Parr 1969, Wettenhall 1975, Yutzy 1970, Zurcher 1968.
7. PROGRAMME EVALUATION IN THE UNITED STATES: Abt 1976, Bennet and Lumsdaine 1975, Campbell 1969, Caro 1977, Cook et al 1978, Cowen 1978, Dawes and Corrigan 1974, Glass 1976, Guttentag 1977, Patton 1978, Rossi and Wright 1977, Weiss 1973, Weiss and Rein 1977.

8. PROGRAMME EVALUATION IN AUSTRALIA: Sarri 1980 has commented on Australian Progress in the last two decades.

9. GOAL ACHIEVEMENT EVALUATION: Deutscher 1977, Freeman 1977, Freeman and Sherwood 1977, Kirusek and Sherman 1968, Rossi and Wright 1977.

REFERENCES

- Abt, C.C ed. 1976. The evaluation of social programs. Beverly Hills: Sage.
- Adams, D. "The Red Cross organizational source of operational problems." American Behavioural Scientist 13:392-403.
- Austin, T. 1967. Aberfan: the story of a disaster. London: Hutchinson.
- Australian Association of Social Workers 1974. Social and Psychological consequences of natural disasters. Brisbane: Australian Association of Social Workers.(Qld.Branch).
- Australian Association of Social Workers. 1975. "Darwin Debriefing". In 14th National Conference. Australian Association of Social Workers.
- Bardsley, K.L., Fraser, A.S., Heathcote, R.L. 1983. "The Second Ash Wednesday: 16 Feb. 1983". Australian Geographical Studies 21:129-141.
- Barton, A.H., 1962. "The Emergency Social System". In Man and Society in Disaster, eds. G.W. Baker and D.W. Chapman, 222-267. New York: Basic Books.
- Bennett, C.A. and Lumsdaine, A.A. eds. Evaluation and experiment: some critical issues in assessing social programmes. New York: Academic Press.
- Birnbaum F, Coplan J, Scharff I, 1973. "Crisis intervention after a natural disaster". Social Casework 4:545-551
- Bondy R E, 1957. "Relief and rehabilitation of families and individuals". Annals of and Academy of Political and Social Science 309:132-141.
- Buchanan, B. 1976. Natural Disasters: their financial impact on the private sector. A report based on the 1974 Queensland Floods in the cities of Brisbane and Ipswich. Brisbane: Queensland Disaster Welfare Committee.
- Bunker E, 1957. "The voluntary effort in disaster relief". Annals of the American Academy of Political and Social Science 309:107-117
- Burlison J, 1977. "The Salvation Army - the relieving of pressures at a major incident". Symposium on Major Incident Intervention, London: City of London Police.
- Bush M, and Gordon A C, 1978. "The advantages of client involvement in evaluation research". In Evaluation Studies Review Annual, ed. T D Cook et al 767-783. Beverly Hills: Sage Publications.

Campbell D T 1969. "Reforms as experiments". American Psychologist 24:409-429

Caro F G ed 1977. Readings in evaluation research. New York: Russell Sage Foundation.

Carr L J, 1932. "Disaster and the sequence - pattern concept of social change". American Journal of Sociology 38:207-218.

Chamberlain E R, Hartshorn A E, Mugglestone H, Short P, Svensson H, Western J S 1981. Queensland Flood Report Australia Day 1974. Canberra: Australian Government Publishing Service.

Chamberlain E R, 1982. "The welfare experience in disasters: a study and its lessons". Continuum 1:31-34. Also published 1980 in Proceedings Welfare Administration Seminar, Macedon: Natural Disasters Organisation.

Chamberlain E R, Doube L, Milne, Rolls M, Western J S, 1981a. The experience of Cyclone Tracy. Canberra: Australian Government Publishing Service.

Chamberlain E R 1980. "The welfare experience in disasters". In Proceedings welfare Administer's Seminar, 60-62. Natural Disasters Organisation. Macedon: Australain Counter Disaster College.

Cisin I H and Clark W B. 1972. "The methodological challenge of disaster research". In Man and Society in Disaster, eds G W Baker and D W Chapman, 23-54 New York: Basic Books

City of London Police. 1974. Major Incidents and serious occurrences. London: City of London Police.

Cook T D, DelRosario M L Hennigan K M, Mark M M, Trochim M K, eds Evaluation Studies Review Annual Volume 3 Beverly Hills: Sage

Cowen E L, 1978. "Some Problems in community program evaluation research". Journal of Consulting and Clinical Psychology 46:792-805.

Cuny P C and Weesner C. 1976. "Post disaster and related low-cost housing: a summary of issues and linkages". In Conference on Human Settlements. Vancouver.

Darwin Disaster Welfare Council. 1976. Final Report. Federal Parliamentary Paper No. 410. Canberra: Australian Government Printer.

Davies R, 1975. "Emergency planning - another social service?" Health and Social Service Journal 4:2652-2653

- Davies R. 1976. "When disaster strikes". Municipal Review 563:240-241.
- Davies R. 1977. "The social effects of major incidents: implications for organisation and practice". In Symposium on Major Incident Intervention. London:City of London Police.
- Dawes R M and Corrigan B. 1974. "Linear models in decision making". Psychological Bulletin 81:95-106.
- De Witt Smith, 1957. "Emergency Mass Care". Annals of the American Academy of Political and Social Science 309:118-131
- Degotardi P R and Grant A P 1975. "The aeromedical evacuation of casualties from the remote disaster area - Darwin the first four days". Medical Journal of Australia. 1:646-648.
- Department of Social Security, Melbourne 1975. Darwin Resettlement Unit. DRU Unpublished paper.
- Deutscher I. 1977. "Toward avoiding the goal trap in evaluation research". In Readings in Evaluation Research, ed. F G Caro, 221-237. New York:Russell Sage Foundation
- Douty C M. 1972. "Disasters and charity: some aspects of cooperative economic behaviour". American Economic Review 62:580-589.
- Drabek T E and Quarantelli E L. 1967. "Scapegoats, villains and disasters". Trans-action 4:12-17
- Dynes R R and Quarantelli E L. 1975. Helping Behaviour in large scale disasters: a social organisational approach. Columbus:Disaster Research Center.
- Dynes R R and Wenger D E 1971. A model of community problem solving and selected empirical applications. Columbus: Disaster Research Center.
- Ericksen N J. 1976. "The dynamics of human adjustment to floods." In Symposium on natural hazards in Australia. Canberra:Australian Academy of Science.(Not published in the proceedings).
- Foster H D. 1976. "Assessing disaster magnitude: a social science approach". The Professional Geographer. 28:241-247
- Form W H and Loomis C P. 1956. "The persistence and emergence of social and cultural systems in disasters". American Sociological Review 21:180-185.
- Freeman H W 1977. "The present status of evaluation research". In Evaluation Studies Review Annual. Vol 2, ed, Guttentag M. 17-51 Beverly Hills:Sage Publications.

Freeman H E and Sherwood C C 1977. "Research in large-scale intervention programs". In Readings in Evaluation Research, ed. Caro F G 205-219. New York: Russell Sage Foundation.

Fritz C E and Mathewson J H 1957. Convergence Behaviour in disasters: a problem in social control. Washington D C: Committee on Disaster Studies. Disaster Study No. 9.

Glass G V ed 1976. Evaluation Studies Review Annual Volume 1. Beverly Hills: Sage Publications.

Gurd C H, Bromwich A, Quinn J V. 1975. "The Health management of Cyclone Tracy". The Medical Journal of Australia 1:641-644.

Guttentag M. 1977. Evaluation Studies Review Annual Volume 2. Beverly Hills: Sage Publications.

Haas J E, Cochrane H C, Eddy D G 1976. The consequences of a large scale evacuation following disaster: The Darwin, Australia, Cyclone Disaster of December 25, 1974. Natural Hazards Working Paper No. 27. Colorado: University of Colorado.

Heatherwick G and Quinnell A L 1976. "Optimising benefits to urban residents of a total flood warning system for the Brisbane Valley". In Proceedings of National Hydrology. The Institution of Engineers: Australia.

Heffron E 1977. "Interagency relationships and conflict in disaster: the Wilkes-Barre experience". Mass Emergencies 2: 110-120.

Indooroopilly Flood Advisory Centre. 1974. Survey of Flood Affected Households. Unpublished paper.

Innes Reid J. ed. 1979. Planning for people in natural disasters. Townsville: James Cook University of North Queensland Department of Behavioural Sciences.

Irish J L and Falconer B 1976. "Reaction to Flood Warning". In Symposium on Natural Hazards in Australia. Canberra: Australian Academy of Science.

Kirusek T J and Sherman R E 1968. "Goal attainment scaling: A general method for evaluating comprehensive Community Mental Health Programs". Community Mental Health Journal 4:443-453.

Leivesley S. 1977. "Australian Disasters: cyclone, flood, bushfire and hailstorm". In Symposium on Major Incident Intervention. London: City of London Police.

Leivesley S. 1977a. "Disaster intervention in Australia". The Journal of the Institute for Civil Defence XL:19-32

Leivesley S. 1977c. "Toowoomba: victims and helpers in an Australian Hailstorm Disaster". Disasters 1:205-216

Leivesley S. 1978. "Lessons from an Australian Disaster". Social Services Quarterly. LI:143-146.

Leivesley S. 1980. Nuclear Reactors: Factors associated with stress in the local community. London: International Disaster Institute.

Leivesley S. 1981. "The social consequences of Australian disasters". In Proceedings, Disasters and the Small Dwelling, Conference at Oxford Polytechnic, ed. I Davis 43-50. London: Pergamon

Leivesley S. 1977b. "Toowoomba: the role of an Australian Disaster Unit". Disasters 1:315-322.

Martin C A. 1974. "Role of the voluntary services". In Disaster Planning, Proceedings of a Synposium held at the Royal Naval Hospital Haslar, 10,11 October 1974. ed. Richardson J W 72-74. London: John Wright and Sons.

McLuckie B. 1975. Italy, Japan and the United States: effects of centralisation on disaster responses 1964-1969. Columbus: Disaster Research Center.

Meads R. 1977. "What of the Future?" In Symposium on Major Incident Intervention. London: City of London Police.

Milne G. 1977. "Cyclone Tracy. 1: Some consequences of the evacuation for adult victims". Australian Psychologist 12: 30-54.

Milne G. 1977a. "Cyclone Tracy II: The effects on Darwin Children". Australian Psychologist 12: 55-62

Moore H E 1957. "Toward a theory of disaster". American Socological Review 21:733-737.

Murphy D W 1971. San Fernando, California, Earthquake of February 9, 1971. Washington: U S Government Printing Office.

National Emergency Services College 1976. Medical Disaster Seminar 26-28 May. Macedon: National Emergency Services College.

National Emergency Services College. 1975. A short guideline to Counter Disaster Principles. Unpublished paper.

Natural Disasters Organisation. 1975. Report on the Darwin Relief Operations, 25 December-8 January 1975 by the Director-General. Canberra: Australian Government Publishing Service.

Oliver J. 1974. "Environmental extreme and human response: a study of tropical cyclones in Queensland". Man-environment Systems. 4:298-301

Parker G. 1975. "Psychological disturbances in Darwin evacuees following Cyclone Tracy". Medical Journal of Australia 1:650-652.

Parr A R . 1976. "New groups in disasters: a study of group emergence in community disasters". In Symposium on natural hazards in Australia. Canberra: Australian Academy of Science.

Patton M Q. 1978. Utilization-focused evaluation. Beverly Hills: Sage Publications.

Petersen, V 1957. "Co-ordinating and extending Federal Assistance". Annals of the American Academy of Political and Social Science 309:52-64.

Power, J M and Wettenhall, R L 1970. "Bureaucracy and disaster 11: response to the 1967 Tasmanian bushfires". Public Administration 29:168.188.

Price J, 1978. "Some age related effects of the 1974 Brisbane Floods". Australian and New Zealand Journal of Psychiatry 12:55-58.

Prince S W 1920. Catastrophe and Social Change. New York: AMS Press 1968 Edition.

Prichard S. 1977. "The involvement of voluntary bodies in disaster situations". In Symposium on Major Incident Intervention. London: City of London Police.

Quarantelli E L and Dynes R R 1976. "Community conflict: its absence and its presence in natural disasters". Mass Emergencies 1:139-152.

Queensland Disaster Welfare Committee. 1974a. Report from the Elmes Road Flood and Community Advisory Centre - Rocklea June 1974. Brisbane: Queensland Disaster Welfare Committee.

Queensland Disaster Welfare Committee. 1974. Executive Officer's Report. Brisbane: Queensland Disaster Welfare Committee.

Rivers J. 1978. "Disaster relief needs more research". Nature 271:299-345.

Ross J L. 1969. "The Salvation Army" its structure operations and problems in disasters". Disaster Research Center Report Series No. 8. Ohio: Disaster Research Center.

Rossi P H and Wright S R 1977. "Evaluation research: an assessment of theory practice and politics". Evaluation Quarterly 1:5-52

- Sarri R C 1980. "Program evaluation: an overview of the state of the art". In Issues in the evaluation of social welfare programs. Australian case illustrations, ed R C. Sarri and R J Lawrence. 1 - 10 Kensington Uni of NSW Press.
- Senate Standing Committee on Social Welfare. "Through a glass darkly". Evaluation in Australian Health and Welfare Services. Volume 2. Canberra: Australian Government Publishing Service.
- Sheldon E B and Freeman H E. 1970. "Notes on Social Indicators: promises and potential". Policy Sciences 1:97-111
- Short P, 1976. "Victims" and "helpers" 1974 floods in the Moreton Region: a working paper. Brisbane: University of Qld Department of Anthropology and Sociology. Unpublished paper.
- Stallings R A 1973. "The community context of crisis management". American Behavioural Scientist 16: 315-322
- Stoddard E R, 1969. "Some latent consequences of bureaucratic inefficiency in disaster relief". Human Organization 28:177-188.
- Ward C J, 1975. Foreign Armed Forces in the relief of natural disaster. London: University of London. Unpublished Thesis.
- Webber D L, 1976. "Darwin Cyclone: an exploration of disaster behaviour". Australian Journal of Social Issues. 11:53-63.
- Weiss C H, 1973. "Between the cup and the lip". Evaluation 1: 97-111.
- Weiss R S and Rein M, 1970. "The evaluation of broad-aim programs: experimental design, its difficulties and an alternative". Administrative Science Quarterly 15:97-109.
- Wenger D E and Milne G. 1976. "Some social effects of a natural hazard: Darwin residents and Cyclone Tracy". In Symposium on Natural Hazards in Australia. Canberra: Australian Academy of Science.
- Wettenhall R L, 1975. Bushfire Disaster: an Australian Community in Crisis. Sydney: Angus and Robertson.
- Wettenhall R L, 1969. "Bushfire Disaster: some social issues". In Social Issues of Today. Hobart: Australian Association of Social Workers 11th Annual Conference.
- Wilkinson M B, 1977. "The Women's Royal Voluntary Service". In Symposium on Major Incident Intervention. London: City of London Police.

Yutzy D, 1970. "Priorities in community response". American Behavioural Scientist 13:344-353.

Zurcher L A, 1968. "Social-psychological functions of emperal roles: a disaster work crew. "Human Organization 27:281-297.

THE VIETNAM VETERAN AS A DISASTER VICTIM

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The introduction of the term post traumatic stress disorder in the DSM III has been one of the most important recent conceptual advances for clinicians working with victims of overwhelmingly stressful events. It has brought together a seemingly disparate collection of diagnostic entities including the post disaster syndrome, war neurosis, battle fatigue, K.Z. syndrome and P.O.W. syndrome and highlights the ubiquity of the emotional responses which individuals manifest when faced by such extraordinary traumas. Its main diagnostic points are the presence of a stress outside the range of normal experience, a subsequent psychic numbing and reduced involvement with the external world in parallel with a persistent re-experiencing of the trauma, and an associated cluster of dysphoric and autonomic symptoms.

Although the concept and clinical description grew out of work by Lifton, Shatan, Bourne, Horowitz and Figley on Vietnam veterans, it has direct relevance to survivors of natural disasters. I have been struck by the marked similarity of the symptomatology, emotional responses and coping skills employed by both the Vietnam veterans and Granville train crash survivors that I have had in therapy. From this perspective it could be argued that the 50,000 Australian Vietnam veterans constitute the survivors of the largest man made disaster in the past quarter century of our history. A disaster which took 494 lives, injured or maimed 2,398 and has left a steadily growing legacy of psychopathology.

Four commonly described features of a disaster are

- a) a high level of psychological stress accompanied by a fear of death and annihilation
- b) a sense of powerlessness
- c) the arbitrary and inexplicable nature of the event which leaves the individual grasping for a meaning behind what has occurred and
- d) a sense of guilt at surviving.

Each of these features can be applied directly to the experiences of Vietnam veterans. As well as the stress engendered by witnessing the horrendous injuries and deaths caused by mines, sniper fire and primitive booby traps, there was a constant and pervasive sense of threat in that the soldier could never feel entirely safe, not even in camp or while on leave nor could he ever be sure who the enemy was. In addition to these obvious threats, there were the more mundane stresses of a totally alien culture, a harsh and inhospitable climate and the risk of

debilitating tropical diseases. In terms of powerlessness, over one third of the Australian soldiers in Vietnam were conscripted National Servicemen rather than volunteers. Compounding this, the Vietnam conflict was essentially a guerilla operation, the enemy attacked without warning and disappeared into the native populace leaving no definable object to strike back at. This engendered a powerless rage and frustration which sometimes spilled over onto innocent civilians.

Soldiers would often find it hard to comprehend why they were in Vietnam and why they were being subjected to these dangers with few positive results to be seen other than body counts and "pacified" hamlets. These confusions and doubts were heightened by the fact many locals who were being "saved" would often view the soldiers with suspicions or as targets for sharp practices. In the large cities, they were confronted with rampant corruption, prostitution and drug addiction, while at the same time newspapers from home were full of reports of anti-Vietnam demonstrations. The culminating event for many veterans in convincing them of the futility of what they had been through was the fall of Saigon to the North Vietnamese in 1975, an event which left many with a stinging sense of rage, bewilderment and betrayal.

Survivor guilt, especially among men who had served in combat units and had lost close friends, continues to be a heavy and persisting legacy. An example is the patient who, as a conscientious and popular infantry corporal, had developed a paternal protectiveness to the younger and more inexperienced men in his platoon. While he was briefly hospitalised for a gastric complaint they stumbled into a mined area and suffered several casualties including two deaths. He came to feel directly responsible for the injuries and deaths and on his repatriation he unconsciously indulged in a whole cluster of self defeating and potentially self-destructive behaviours in a futile attempt at reparation and expiation.

It has been demonstrated in both disaster and military operations that group support and cohesion play a major protective role and when these break down the level of psychiatric dysfunction increases rapidly (Boman, 1979). Two contrasting examples from the disaster literature are Aberfan (Williams & Parkes, 1975) and Buffalo Creek (Titchener & Kapp, 1976). While on the whole Australian soldiers in Vietnam had a high level of morale and group cohesion, a number of factors tended to increase the alienation they experienced. Unlike earlier wars where the soldier went to battle and came home with his unit, a significant number travelled to Vietnam as individuals on commercial aircraft, joined an already existing unit for exactly twelve months and then returned by themselves. Base units especially tended to have people rotating through them without any opportunity for any *esprit de corps* to develop. Not surprisingly support troops had the highest rate of psychiatric

casualties, especially alcohol abuse and conduct disorders (Boman, 1982). In addition, on their return Vietnam veterans did not experience the same outpouring of community welcome and gratitude which their fathers had been accorded at the end of W.W.II. Not infrequently they were stigmatised by their peers as inhuman monsters who had enthusiastically participated in the slaughter of innocent women and children. Families often displayed a degree of ambivalence in their welcome, feeling that the soldier had abandoned them and it has often been reported that veterans' families neither wished, nor were able to comprehend the nature of what they had been through. One study has shown that in the six months following repatriation, 38% of veterans' marriages disintegrated (Wilson, 1979). Compounding this sense of alienation was the fact that the labour market had tightened considerably in their absence and many veterans reported that they were actively discriminated against by employers. In *Totem and Taboo*, Freud (1960) pointed out the vital importance of community prescribed rituals and support in removing the soldier's warrior status, sanctioning the aggressive acts he had indulged in and reintegrating him in the social matrix. Veterans in therapy describe the first few years after coming home as possessing an unreal, dreamlike and isolated quality; a time when they lacked a sense of direction, belonging or stability, and when the main task seemed to be to forget their Vietnam experiences. Physically in Australia, they were psychologically still in Vietnam. Perhaps Bettelheim (1979) best summarises the importance of social support at times of stress: "One cannot meet catastrophic events and survive when deprived of the feeling that somebody cares".

A defence commonly observed in the community when dealing with threatening events, is to blame the victim for his own misfortune. This has happened to Vietnam veterans in the U.S. where they have been discriminated against by the American Legion, and portrayed in movies and TV dramas as walking time bombs or depraved dope fiends, responsible for their country's first major military defeat.

Clinical Profile of Hospitalised Vietnam Veterans

To illustrate the kinds of clinical problems that are being experienced by Australian Vietnam veterans, the profiles of the last 25 hospitalised under my care in the psychiatric unit at the Concord Repatriation General Hospital in Sydney will be described. The data comes from standard, non-directive assessment interviews, information gathered from families and material that subsequently surfaced in therapy.

The average age of the patients was 34 years and their average length of stay was 22 days. The main presenting problems are listed in Table 1, their current social backgrounds in Table 2, details of Vietnam service in Table 3 and some major developmental variables in Table 4.

As can be seen, quite a disconcerting picture emerges. Almost invariably the veteran's hospitalisation was associated with some behind a scene of domestic crisis and violence. form of impulsive "acting out" and he was often brought to hospital in a context of some drama, frequently escorted by police, very often under the influence of alcohol and in many cases leaving behind a scene of domestic crisis and violence.

TABLE 1

FREQUENCY OF PRESENTING COMPLAINTS AMONG HOSPITALISED
VIETNAM VETERANS AND CURRENTLY SERVING MILITARY CONTROLS

PRESENTING PROBLEM	VIETNAM VETERAN %(N=25)	CURRENT MILITARY %(N=25)	2 (X) p _≤ .05
DEPRESSION	88	52	SIG
ALCOHOL ABUSE	84	40	SIG
IMPULSIVE VIOLENCE	56	36	NOT SIG
SUICIDE ATTEMPT	40	36	NOT SIG
CHRONIC PAIN	44	-	
DRUG ABUSE	40	12	SIG
POST TRAUMATIC STRESS DISORDER	40	4	SIG

TABLE 2

CURRENT PSYCHOSOCIAL BACKGROUND VARIABLES
AMONG VIETNAM VETERANS AND MILITARY CONTROLS

SOCIAL DYSFUNCTION	VIETNAM VETERAN % (N=25)	CURRENT MILITARY % (N=25)	² (X) p< .05
SIGNIFICANT MARITAL DYSHARMONY	44) 84	36) 52	SIG
DIVORCED - SEPARATED	40)	16)	
SEXUAL DYSFUNCTION	44	32	NOT SIG
UNEMPLOYED FOR LAST 3 MONTHS	48	-	
LEGAL PROBLEMS SINCE REPATRIATION OR LAST 10 YEARS	44	32	NOT SIG

TABLE 3

DETAILS OF VIETNAM SERVICE
(REGULAR ARMY 20, NATIONAL SERVICE 5)

	FREQUENCY % (N=25)
COMBAT ROLE, HIGH STRESS, EXPOSURE TO DEATH AND INJURY	44
SUPPORT ROLE, HIGH STRESS AND DANGER	24
SUPPORT ROLE, LOW STRESS AND DANGER	32
POST TRAUMATIC STRESS DISORDER	
ACUTE	16
CHRONIC	40
SERIOUS DISCIPLINARY INFRINGEMENTS	28

NOTE 36% of the currently serving comparison group had serious disciplinary infringements in the 18 months before hospital admission.

TABLE 4
FREQUENCY OF DEVELOPMENTAL VARIABLES

	VIETNAM VETERAN % (N=25)	CURRENT MILITARY % (N=25)	2 (X) p< .05
PARENTAL VIOLENCE AND CONFLICT	36	44	NOT SIG
PHYSICAL ABUSE	24	24	NOT SIG
PARENTAL SEPARATION OR BEREAVEMENT	24	44	SIG
PATERNAL ALCOHOLISM	44	36	NOT SIG
NEUROTIC, CONDUCT PROBLEMS	24	32	NOT SIG

The veteran's current level of psychosocial functioning was frequently seriously impaired. In some 84% there was either marital disruption or break up, often linked with repeated violence directed towards the spouse or children. Almost half had been unemployed for the three months before their admission and a similar percentage had been convicted of offences since their repatriation. Crimes included murder, fraud, assault, possession of drugs and repeated driving under the influence charges. One of the sample has subsequently been murdered and one has suicided.

During their tour of duty in South Vietnam, two thirds were exposed to high levels of stress or danger, almost half were in combat and witnessed scenes of death and mutilating injury. Forty percent of the veterans manifested symptoms and signs diagnostic of a post traumatic stress disorder (PTSD) at the time of their hospitalisation. All the troops that had been in combat exhibited features of a PTSD; those with a PTSD who came from support units had all been exposed to considerable stress and danger. While serious disciplinary infringements were frequent in Vietnam, they were almost always confined to men in comparatively low stress support roles.

The problems of many men in the sample, however, date back to well before Vietnam. The fact that in the hospitalised sample the ratio of volunteers to National Servicemen (80% vs 20%) was greater than in the army in Vietnam (63% vs 37%) would suggest a bias toward psychopathology. Volunteers in both the Australian and American forces tended to become psychiatric casualties during their tour of duty more often than conscriptees (Boman, 1982). It often emerges in therapy that the decision to enlist in the first place was an attempt at coming to grips with adolescent crises around masculinity, independence and self esteem. These insecurities can be understood when it is realised that the veteran's early environment was often characterised by parental conflict, violence and separation, physical abuse and paternal alcoholism. Almost a quarter had manifested significant neurotic or conduct disturbances during their childhood years.

Clinical Profile of Hospitalised Currently Serving Military

The question that arises is how many of these presenting problems can be attributed to Vietnam and how many might be the expected psychopathology among a group of disturbed young adult males from a military background. In an attempt to answer this, the 25 currently serving, aged-matched, army members who had most recently been hospitalised under my care were compared on the same variables. The details are listed in tables 1,2 and 4.

It can be seen from Table 1 that while the same overall pattern of depression, alcohol abuse, violence and suicidal behaviours emerged, their frequency was less in the currently serving group. The most important clinical difference between the two groups was the almost total absence of post traumatic stress disorder among the non-Vietnam troops. The marked difference between the two groups in psychogenic pain disorder was an interesting and unexpected finding.

It might be suggested that those currently in the armed services, being in a structured and disciplined environment, might be less at risk for "acting out" behaviours, though one could also argue that it was the stress of the Vietnam experience, itself, that may have pushed the veterans in the direction of explosive violence, subsequent depressive reactions and the palliative use of alcohol. Likewise, one of the more frequently observed dynamics in psychogenic pain disorders is the inability to come to grips with feelings of guilt and anger, effects which were inevitably linked to the Vietnam experience.

It is also possible that the Vietnam veterans had a significantly more disturbed developmental milieu, predisposing them to psychopathology in later life. However, when the groups were compared on developmental variables, a similar pattern was found (Table 4).

The overall conclusion is that while a group of hospitalised Vietnam veterans display impulsive, "acting out" psychopathology similar to a hospitalised military group who had not been overseas, they do so with somewhat greater frequency and, in addition, 40% display features of a post traumatic stress disorder. Psychogenic pain disorder, often linked with drug abuse, occurred frequently among the veterans but not in the presently serving group. The excess of psychopathology among the veterans cannot be explained in terms of more disturbed early backgrounds.

Hospitalised Veterans Compared with Veterans at Large

Among hospitalised American Vietnam veterans, the same symptom cluster of anti social behaviours, alcohol abuse, somatization disorders, suicide attempts, aggressive outbursts and depressive reactions has been reported. They also have high levels of conflict in intimate relations and developmental backgrounds characterised by violence, separation and parental alcoholism (Strange and Brown, 1970; Braatz and Lumry, 1969). When compared with personnel currently in the military, hospitalised U.S. veterans had higher frequencies of psychopathology, especially stress related symptoms and somatization disorders (Strange and Brown, 1970). Is this level of violence and impulsivity in hospitalised veterans representative of the whole population of returnees?

There are few Australian studies directed to this question, however the highly publicised reports of increased suicide rates among Australian veterans have been shown to be unfounded. Sensational claims suggesting 470 have died at their own hands were not borne out either in figures presented to the recent Senate Standing Committee enquiry (Senate Standing Committee on Science and the Environment, 1983) or by a Repatriation Department survey among Victorian veterans. It is likely that the rate in Australia is no higher than expected from a matched group of adult males in their early thirties. In contrast, in the U.S., serving in the military during the years of the Vietnam conflict without going there (i.e. Vietnam era veteran) is associated with a 23% increased suicide rate (Presidential Review Memorandum on Vietnam-era Veterans, 1978).

American studies suggest that Vietnam veterans exhibit no higher levels of violence and criminal behaviour than Vietnam era veterans (who had no service in Indo China) (Presidential Review Memorandum on Vietnam-era Veterans, 1978), or currently-serving, non-combat military personnel (Strange and Brown, 1970) or young adult working class males (Starr, 1973) and that their rate of criminality is no greater than would be predicted from their premilitary behaviour and backgrounds (Nace et al., 1978).

Rates for alcoholism among Vietnam veterans have been demonstrated to be between 8 and 16% (Nace et al., 1978; Goodwin, Davis and Robins, 1975), not dissimilar to that for U.S. males in general (Cahalan and Room, 1974; Ewalt, 1981) and compare

favourably with those from Vietnam-era Veterans, (between 13% and 31%) (Presidential Review Memorandum on Vietnam-era Veterans, 1978; Ewalt, 1981) and currently serving U.S. military personnel (11%) (Burt, 1982). Likewise, while there was a slight tendency for Vietnam veterans who had seen heavy combat to abuse drugs more frequently, overall, there was no difference between veterans and controls (Ewalt, 1981).

Several American studies have demonstrated a clear relationship between combat stress and subsequent development of a post traumatic stress disorder. The relationship has little to do with the soldier's background but is associated with a number of social support variables including the perception of the helpfulness of one's family on repatriation, the rapidity of discharge from the army and the level of support given by one's soldier friends (Egendorf, Kadushin and Laufer, 1981; Frye and Stockton, 1982; Martin, 1981). In one seemingly healthy and well functioning sample of veterans, 43% continued to display features of a post traumatic stress disorder (Frye and Stockton, 1982). A number of studies have also reported the ubiquity of depressive reactions among veterans (Strange and Brown, 1970) with a direct relationship to the degree of combat stress experienced in Vietnam (Helzer, Robins and Davis, 1976). There is the suggestion though, that depression is not such a persisting problem as post traumatic stress disorder (Helzer, Robins and Davis, 1976).

The Atypical Symptoms of Hospitalised Veterans and Current Serving Military

As a group, U.S. Vietnam veterans continue to suffer from depressive reactions and post traumatic stress disorder in rates greater than controls and in direct relationship to combat stress. However they are no more likely to be violent, alcoholic, drug dependent or convicted of criminal offences than others in their age group. If these American data can be transferred to Australian veterans, then it can be reasonably assumed that the impulsive violence, legal difficulties, alcohol and drug abuse and suicidal behaviours of the Vietnam group at Concord Repatriation General Hospital are not at all representative of Australian Vietnam veterans as a whole. In addition, this symptom cluster was observed both among our hospitalised veterans and our currently serving group. The prevalence of post traumatic stress disorder (40%) was very much like that described among a group of well functioning U.S. veterans (43%), and its absence in the controls reinforced the point that this is the main psychiatric disorder associated with service in Vietnam. Likewise, the high level of depression among the veteran group is consistent with U.S. findings that the condition is also linked with Vietnam service, and it is of note that the controls suffered from it some one third less frequently.

If hospitalised Vietnam veterans, both in this country and the U.S., are so atypical when compared with the rest of returnees, what are the diagnostic and psychotherapeutic implications? I wish to offer a highly impressionistic, clinical and decidedly non scientific explanation:

The impulsivity and low frustration tolerance of the hospitalised veterans, their propensity for non-adaptive violence, frequent episodes of depression, difficulties with interpersonal relationships which have both highly unstable and deeply dependent qualities, and their abuse of alcohol and drugs are all suggestive of borderline personality functioning. In the ward milieu, they frequently demonstrate these features in their behaviour with staff and other patients, and are often surrounded by a highly charged ambience of *Sturm und Drang*. As with borderlines, they are very adept at stirring up conflicts among staff, half of whom come to see the veteran as a victim of government deception and horrendous war stresses, needing to be given extra amounts of TLC and protection; while the other half view him as a manipulative psychopath escaping his family responsibilities and malingering to obtain fraudulent compensation. Other borderline features which tend to emerge with time are a deep sense of entitlement and a chameleon like tendency to become part of whatever group they have contact with at the moment. A not uncommon phenomenon is that veterans with little or no combat experience identify strongly with those who have, to the extent that they internalise all the details of enemy contacts, fire fights and dramatic "dust offs" and then relate them as if they were their own. It is my strong clinical impression that many of these patients latch on to the role of "Vietnam veteran" as if this were their only source of identity, self-esteem and purpose, and that without it, there would be little security in life for them to cling to. This is very reminiscent of Kernberg's description (Kernberg, 1975) of the borderline's constant search and need for external organisations and groups with which he coheres and identifies in an attempt to overcome his lack of an integrated self concept.

Conclusion

I have described here much that is common to victims of disasters and to Vietnam veterans and how significant numbers of veterans continue to have depressive reactions and stress related symptoms. Despite this, the great bulk of veterans have been able to reintegrate into society and lead lives which contain a measure of stability and satisfaction. There remains, though, a small group of highly visible, angry and chaotic individuals with many borderline traits, requiring frequent hospitalisations, and whose Vietnam experiences make up but one part of their deprived and disorganised lives. Clearly, to focus on this group's twelve months in Vietnam to the exclusion of all else would be to do them a grave therapeutic disservice, just as it is to say that all their personality difficulties, marital disruptions and psychosocial dysfunctions are due to chemical poisoning about which nothing can be done except to write them a cheque and send them on their way.

REFERENCES

- Bettleheim, B. (1979) The holocaust - one generation later. In: Surviving & Other Essays. New York, Knopf.
- Boman, B (1979) Behavioral observation on the Granville train disaster. Social Science and Medicine, 13 A, 463-471.
- Boman, B. (1982) The Vietnam Veteran ten years on. Australian and New Zealand Journal of Psychiatry, 16, 107-127.
- Braatz, G.A. and Lumry, G.K. (1969) The young veteran as a psychiatric patient. Military Medicine, 134, 1434-1439.
- Burt, M.R. (1982) Prevalance and consequences of alcohol use among U.S. Military personnel, 1980. Journal of Studies on Alcohol, 43, 1097-1106.
- Cahalan, D. and Room, R. (1974) Problem Drinking Among American Men. New Brunswick, Rutgers Center of Alcohol Studies.
- Egendorf, A., Kadushin, C. and Laufer, R.S. (1981). Legacies of Vietnam: Comparative Adjustment of Veterans and their Peers, Vols 1-5. Washington, D.C., U.S. Government Printing Office.
- Ewalt, J.R. (1981) What about the Vietnam veteran? Military Medicine, 146, 165-167.
- Freud, S. (1960) Totem and Taboo. London, Routledge and Kegan Paul Ltd.
- Frye, J.S. and Stockton, R.A. (1982) Discriminant analysis of post traumatic stress disorder among a group of Vietnam veterans. American Journal of Psychiatry, 139, 52-56.
- Goodwin, D.W., Davis, D.H. and Robins, L.N. (1975) Drinking amid abundant illicit drugs. Archives of General Psychiatry, 32, 230-233.
- Helzer, J.E., Robins, L.N. and Davis, D.H. (1976) Depressive Disorders in Vietnam returnees. The Journal of Nervous and Mental Diseases, 163, 177-185.
- Kernberg, O. (1975) Borderline Conditions and Pathological Narcissism. New York, Jason Aronson.
- Martin, J. (1981) Marital status, spouse support and mental health. In: Legacies of Vietnam. Vol. 4, Longterm Stress Reactions Some Causes, Consequences and Naturally Occurring Support Systems. Washington D.C. U.S. Government Printing Office.

Nace, E.P., O'Brien, C.B., Mintz, J., Ream, N. and Meyers, A.L. (1978) Adjustment among Vietnam drug users two years post-service. In: Stress Disorders Among Vietnam Veterans (Ed. C.R. Figley). New York, Brunner/Mazel.

Presidential Review Memorandum on Vietnam-era Veterans, U.S. House Committee on Veterans Affairs, 96th Congress, first session, 1978. Washington. D.C., U.S. Government Printing Office.

Senate Standing Committee on Science and the Environment. Vietnam Veterans Herbicide Inquiry. Australian Government Printing Office, 1983.

Starr, P. (1973) The Discarded Army: Veterans After Vietnam. New York, Charterhouse.

Strange, R.F. and Brown, D.E. (1970). Home from the war: a study of psychiatric problems in Vietnam returnees. American Journal of Psychiatry, 127, 488-492.

Titchener, J.L. and Kapp, F.T. (1976) Family and character change at Buffalo Creek. American Journal of Psychiatry, 133, 295-299.

Williams, R. and Parkes, S.M. (1975) Psychosocial effects of disaster: birth rate in Aberfan. British Medical Journal, 2, 303-304.

Wilson, J.P. (1979) Forgotten Warrior Project. Disabled American Veterans, Cincinnati.

Yager, J. (1976) Post combat violent behaviour in psychiatrically maladjusting soldiers. Archives of General Psychiatry, 33, 1332-1335.

TROPICAL CYCLONE OSCAR (1983)

PSYCHOLOGICAL REACTIONS OF A FIJIAN POPULATION

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INTRODUCTION

On the basis of interview and questionnaire data, 75 rural Fijians who survived Cyclone Oscar and 64 control subjects from a nearby unaffected urban area were compared on the following measures: pre-hurricane adjustment, hurricane experience, post-hurricane adjustment, physical symptoms, and psychological functioning.

Psychosocial response to disaster has been well described by many authors (see review by Kinston and Rosser, 1974). Specific research on cyclones has also been extensive (e.g. Crashaw, 1963; Parker, 1979, Patrick, 1981). Cyclone Oscar, described here, differed in several respects from those previously investigated. The scale of the disaster was modest, for instance there was no loss of life in the village studied. The population was not homogeneous containing two races and three religious groups. Finally there had been virtually no past contact with psychological or psychiatric services.

Many previous reports were descriptive and concentrated on behaviour during the Impact or Recoil Phases (Tyhurst, 1951). This study looked at the aftermath, using objective instruments as well as clinical assessment. In addition a control group was employed.

The aim of this study was to examine psychological morbidity during the months after the cyclone. How prevalent was disturbance and did this change with time? What forms did it take? What factors were associated with good or bad outcome?

The cyclone, named Oscar, struck the coast of Viti Levu, the main island of the Fiji Islands on the night of 1st March 1983. The cyclone had maximum sustained winds of 100 knots with gusts of up to 140 knots near its centre. Oscar has been classed as the worst natural disaster in Fiji since the cyclone of 1931. Nine lives were lost and preliminary damage estimates were about \$Aust. 85 Million (about 6 percent of Fiji's Gross Domestic Product).

The weather reports had been mentioning Cyclone Oscar for a week before its arrival. Initially it was moving westwards, away from Fiji. However by 28th February it had turned to a southeasterly direction and cyclone warnings were issued frequently until Oscar's arrival.

At Nabila, the community investigated here, the eye of the cyclone passed approximately 15 km out to sea, resulting in the settlement receiving the full brunt of the cyclone. The winds started blowing about 2pm and by 6pm were hurricane force. At 7pm there was a sudden rise in the level of sea (due to large waves, low atmospheric pressure and high tide) which caused flooding of coastal and low lying areas. For half an hour at 8.00pm the wind quietened but did not stop. People moved about checking damage or tried to reach a safer place. Then the wind returned from another direction, with even greater ferocity. By 2.00am the wind had dropped to storm force.

The relatively long duration of the hurricane winds (7 hours) due to the slow movement of the cyclone, enhanced the damage and the fear it caused. The experience was made even more frightening by the lack of visibility, due to the sheets of water accompanying the wind and the blackness of the night. The unexpected flood, the disintegrating houses, and physical impossibility of moving against the wind, compounded the terrifying experience. The wind's assault on his house was compared by one villager to a claw hammer trying to get out a difficult nail. When it couldn't get it from one direction it swung around to another. No one was killed in the settlement but one person was crushed badly and many received cuts. Every house was damaged, 90 percent lost their roofs more than half were completely destroyed.

METHOD

The cyclone affected area studied, was the settlement of Nabila, on the western coast of Viti Levu 30 kilometres by road from Nadi, the nearest town. Nabila consisted of about 25 modest dwellings each on a small pocket of land from 2 - 25 acres all of which are leased. Most of the farmers were Fijian Indians, descendants of indentured labourers brought in a century ago. Amenities included a shop and primary school.

The control group, was selected from an area of urban Lautoka, the second largest city of Fiji. The dwellings in this area were also modest mostly government low cost housing.

In Nabila every house was visited and in Lautoka approximately every fourth house was chosen. If an occupant was temporarily absent, a return visit was made. In this way most inhabitants over the age of 16 years were included in the sample. In the entire survey only one of the 140 subjects approached declined to take part. This was an elderly lady who, her family explained, had been very depressed and withdrawn since the cyclone.

The average time for collection of data following the cyclone was 10 weeks, ranging from 8 to 12 weeks post cyclone.

The instruments used were:

1. The General Health Questionnaire (GHQ)
2. A Physical Symptom Inventory
3. A questionnaire comprising: a) demographic data; b) adjustment prior to the hurricane; c) experience during the hurricane; d) adjustment after the hurricane.
4. Interviewer's assessment of; a) social class; b) presence of current clinical psychiatric illness; c) social role of the individual (whether or not a community leader).

The GHQ has been widely used as a screening instrument, for psychiatric morbidity in community samples. It has been validated for such diverse populations as India, Spain and Jamaica (Goldberg, 1978). The GHQ was also administered to the evacuees from Cyclone Tracy (Parker, 1977). When used as a screening instrument the GHQ can assign each respondent into either a probably healthy or a 'probable psychiatric case' category. For this study a threshold GHQ score was adopted so as to produce a morbidity rate of 15 percent in the control group since this figure is the average level of psychological morbidity seen in most community surveys. The GHQ 28 was selected as the main instrument to assess psychiatric morbidity since it could also give information on symptom profile (Goldberg, 1978)

The Physical Symptom Inventory consisted of a list of 20 common physical symptoms including those reported as occurring in disaster victims (Leopold and Dillon, 1963). The questions were asked in the following form; 'have you recently been suffering from (the symptom)?' 'If so, is this symptom new to you?'

This approach thus provided three scores: a) Total Current Symptoms, b) New Symptoms and, by subtraction, c) Pre-existing or baseline Symptoms.

Fourteen individuals with past psychiatric history, high GHQ scores and high proficiency in English were given more detailed psychiatric assessments and an attempt was made to arrive at a clinical diagnosis.

DATA ANALYSIS

Statistics employed were largely Chi square analyses of cross tabulated data; for instance Age was grouped into those below 25 years, 25 to 50 years and those over 50 years. In some instances Student t Tests or Pearson Correlation Coefficients were used where appropriate.

RESULTS

The Sample

The sample consisted of 75 cyclone victims and 64 urban controls of whom 51 percent and 47 percent respectively were males.

The two groups were comparable on demographic variables except that Fiji Indians comprised 89 percent of the cyclone group and 71 percent of the urban controls, reflecting the tendencies for farmers to be Indian. Ages ranged from 16 to 76 years, mean 34 years and was similar to the age distribution in the 1981 census. The Indians were either Muslim or Hindu while the Fijians were Christian. Two thirds were married. Separated and widowed people were rare. Twenty percent were rated as middle class. Eight percent were clearly leaders of the community or family groups.

Pre-cyclone adjustment of both groups was similar. The vast majority living with first degree relatives, 57 percent were employed or full time students, 9 percent had received previous medical treatment for 'nerves', 47 percent of the affected group and 41 percent of the controls were under regular medical treatment or had seen a doctor in the month preceding the cyclone. The mean number of pre-existing physical symptoms was 2.7 and 2.8 respectively.

Of the cyclone affected group 75 percent thought they would be killed; 40 percent fled their homes; 19 percent were injured; 40 percent suffered severe property losses and 37 percent moderate losses; 13 percent ceased work or full time studies.

OUTCOME MEASURES

a) General Health Questionnaire

A case rate of 33 percent was obtained for the cyclone affected group compared with 15 percent for the controls.

On the symptom subscales the affected group had significantly higher scores for anxiety and somatic concern but not for depression.

b) Physical Symptoms

The affected group had more current symptoms, (mean 6.1) than the controls (mean 4.7). Forty three percent and 25 percent respectively had three or more new physical symptoms. Both these differences were significant at the 0.05 level. The most frequently complained of new symptoms were loss of appetite, headache, exhaustion, dizziness and chest pain.

GHQ scores and the number of new symptoms were highly correlated ($r = 0.38$, $p < 0.01$). Of those cyclone victims assessed as probable psychiatric cases 78 percent had 3 or more new physical symptoms. Twenty five percent of the cyclone affected group had both psychiatric disturbance and multiple new physical symptoms.

c) Post Disaster Adjustment of Cyclone Victims

Sixty six percent were troubled by persistent fears. These were mostly of a recurrence of the cyclone but also of drowning, infectious disease or fires. Acute upsurges of fear were precipitated by gusty winds or an overcast sky.

Forty seven percent felt their health had deteriorated and 49 percent had sought medical treatment.

The proportion in paid employment or full time students had dropped from 57 percent to 44 percent.

On a more optimistic note 64 percent felt that they were coping well with the crisis. A further 64 percent felt that in time life would be as good as it was before.

d) Resolution of Symptoms With Time

The cyclone affected group was divided into the 37 subjects seen in the eighth and ninth week after the cyclone and the 38 seen in the twelfth week. The two groups were comparable

on demographic variables and degree of cyclone stress except for an excess of middle class individuals in the first assessed group.

(Examination of the relationship between social class and outcome measures however revealed no significant associations).

i) Psychiatric morbidity: using the GHQ 45 percent of those assessed at two months were probable 'psychiatric cases' compared to 19 percent of those seen at three months.

ii) Physical symptoms: Forty seven percent of the first group had 3 or more new physical symptoms compared with 29 percent of the later group. Gastrointestinal symptoms such as nausea and loss of appetite were prominent new symptoms in the first group but had largely disappeared by three months.

iii) Post disaster adjustment: two thirds of both groups still suffered recurrent fears. On other items such as health, employment, accommodation and view of the future there was a trend for the later group to report fewer difficulties.

e) Predictors of Outcome

When each demographic pre-cyclone adjustment and cyclone experience variable was examined in relation to the outcome measures few significant associations were found.

The elderly were more likely to suffer 3 or more new physical symptoms ($\chi^2 = 6.1$ with 2 degrees of freedom, $p < 0.05$). There also was a trend for those over 50 to be more often assessed as 'probable psychiatric cases'.

There was a highly significant association between severity of property loss and GHQ assessment of psychiatric morbidity ($\chi^2 = 13.99$ with 2DF, $p < 0.01$). Those with heavy losses also tended to have more physical symptoms and poorer social adjustment. Those who thought they were going to die during the cyclone were more likely to develop subsequent persisting fears.

"Good overall outcome" was defined as having two or less new physical symptoms and assessment as 'probably not a case' by the GHQ. Fifty percent of the villagers met these criteria however none of the variables examined were associated with 'good outcome'.

f) Clinical Psychiatric Diagnosis

Of the fourteen who were assessed in more detail a DSM III diagnosis was arrived at in thirteen cases. It should be remembered that this was not a random sample but selected on the high probability of psychiatric disturbance.

Six met the DSM III criteria for the Acute Post Traumatic Stress Disorder. Three cases had major depression, two indeed had melancholia. One known case of bipolar affective disorder suffered a depressive episode precipitated by the cyclone.

Three cases were found in which there was a mixture of anxiety and depressive symptomatology, i.e. Atypical Depression. A supplementary primary diagnosis of Alcohol Abuse and Drug Abuse was made in two to the above cases. (The drug abused was Yagona, a locally crushed root containing small amounts of opiate-like alkaloids).

DISCUSSION

Psychological Morbidity

Ten weeks after the cyclone, the proportion of 'psychiatric cases' in the survivors was more than double that in the controls. Since the experimental and control groups differed significantly in race and religion, it is important to note that these variables did not account for the group differences in GHQ score since they were not associated with either the GHQ or the new physical symptoms index. Thus the racial differences did not account for the excess morbidity in the cyclone group. A rate double that of controls, was also found by Parker (1977) using the GHQ on evacuees after Cyclone Tracy.

Anxiety, rather than depression accounted for most of this psychiatric disturbance. This was manifested as muscular tension, apprehension, restlessness, fears, inability to concentrate, unwanted memories of the cyclone intruding into consciousness and double checking. Some of these symptoms were found in almost all cyclone victims. The preponderance of anxiety over depressive symptoms was also noted in cyclone victims by Parker (1977) and Patrick (1981) and in marine fire survivors by Leopold and Dillon (1963).

Although depressive symptoms were less common, those most frequently mentioned were 'worrying too much', 'sadness' most of the time, 'lack of energy' or 'irritability'. Very few admitted to being suicidal or wishing they were dead. These questions usually caused embarrassed giggling and denial, even in subjects who had just admitted to feeling totally hopeless. By contrast Patrick (1981) found 41 percent of his Sri Lankan sample were 'suicidal'. This may reflect religious differences as his sample were Hindus who do not regard suicide with as much opprobrium as Christians or Muslims. Despite its relative rarity the most disabled individuals seen were those suffering from severe depression. As there was no mortality, the depressed individuals usually related their mood to lost possessions. In most cases these material losses were extensive but occasionally they were small treasured items such as a photo collection.

Physical Morbidity

In this study subjects were questioned on their level of physical symptoms. There was no attempt to measure the prevalence of physical illness or relate it to utilisation of medical services.

Changes in these two aspects of health have however already been clearly related to stress. Wyler, et al (1971) found a relation between the magnitude of life change scores and the actual severity of subsequent disease. While after both the Bristol floods (Bennet, 1970) and Brisbane floods (Abrahams, 1976) there was a marked increase in the utilisation of all medical services.

In this study the proportion of victims with multiple new physical symptoms was nearly twice that found in the control population. Thus the rise in psychiatric symptoms was paralleled by that of physical symptoms. It is interesting to note that there were not two separate groups of reactors to the cyclone i.e. 'somatizers' or 'neurotics'. In a large proportion of cases it was the same individuals who bore the brunt of the physical and psychiatric distress. This overlap between physical and psychiatric illness has been noted in many studies (Andrews, 1978).

Rapid Resolution

By three months after the cyclone both the psychiatric morbidity, (as judged by the GHQ), and level of physical symptoms, had almost reverted to that found in a non-affected control population. This is despite an ongoing crisis in the form of water shortages and crop losses. It appeared that the acute, life threatening stress of the cyclone left in its wake a high level of psychological disturbance; 45 percent of the population ill enough to be regarded as requiring psychiatric treatment at two months. This early peak was followed by a rapid return to near normal levels of symptoms. In the study most closely comparable to this one, Parker (1977) investigating Cyclone Tracy evacuees using the GHQ found 58 percent morbidity initially, falling to 41 percent at ten weeks and 22 percent, the control level, at fourteen months.

While the survey was being conducted a difference between those interviewed early and later was apparent. The first group had a pressure to talk about the cyclone, they would go over and over the events of that night. This was much less apparent in the second group. This urgency to ventilate and not letting go was reminiscent of Tyhurst's (1951) description of behaviour during the 'recoil' phase, shortly after a disaster.

Outcome Predictors

When we examined the potential 'predictors' of morbidity there was a surprising dearth of significant relationships. This may indicate that the degree of distress was fairly uniformly experienced by all groupings in the settlement. The major finding was the strong association between the severity of property loss and subsequent psychiatric morbidity.

In another cyclone study a similar trend was found by Parker (1977). After the Bristol floods Bennet (1970) found an association between property loss and medical attendances but not with psychiatric symptoms. Several authors for example (Crashaw 1963 and Edwards 1976) observed that it was the elderly who were most distressed by the destruction of their homes and possessions. Possibly this was due to the loss of symbolic assets as well as the realistic assessment that they were less likely than the young, to be able to successfully rebuild in their lifetime.

It was also found that increasing age, particularly over 50 years, was associated with a greater likelihood of multiple physical symptoms. This was not just a function of age, as in the non-cyclone affected control group there was no significant relationship between aging and new symptoms. The elderly also tended to be more often assessed as psychiatrically ill by the GHQ. This trend was not apparent in the control group beside which the age of the population has no clear effect on the GHQ (Goldberg, 1978). This age relation has been noted in most other disasters studied (Price, 1978; Leopold and Dillon, 1963 and Bennet, 1970).

The association between fear of death or serious injury during the cyclone and the development of subsequent fears of strong winds is also hardly surprising. This fear, in some cases terror, occurring during a disaster has been called 'mortality stressor' by Parker (1977) and was associated with psychiatric morbidity shortly after the cyclone. At 10 weeks he found, as was the case in this study, that there was a trend for it to be associated with the GHQ score.

With so many variables examined in relation to outcome the possibility of associations arising through Type II error must be considered. However these three positive findings are well supported by previous research. Some of the negative findings were in contrast to those usually reported. Many disaster studies show women to be more vulnerable (Abrahams, 1976; Bennet, 1970 and Parker, 1977); this is not the case in this study. While minor psychiatric morbidity is more common in women in Western countries it is not always found in third world countries (Oxley and Wing). Edwards (1976) and Kinston and Rosser (1974) noted the effect of disasters on the mentally ill and commented that they were predisposed to develop more psychiatric disturbance.

No effect was found in this study, possibly reflecting the relatively minor nature of most of the previous psychiatric complaints. It was postulated that being the head of a family and in a position to make decisions and to some extent determine the pattern of reconstruction might be a healthy coping style. The numbers were small but even so no trend emerged. Race and religion had no effect, even though the Indians tended to have more material possessions and thus greater property losses.

Aspects of the cyclone, such as staying put or being hurt were not significant predictors of outcome.

"Good overall outcome" which was assessed in this study as low GHQ score and few new symptoms, had no significant associations. The most important protective and reparative factor in a disaster appears to be the support offered to the individual by his social network (Boman 1979). While this was very much in evidence in Nabila it was not able to be measured by the somewhat insensitive variables used in this study.

CONCLUSION

This study provides information on the natural history of human response to disasters. In this case compensation issues or psychological intervention did not influence the outcome. This data should be of value to health service planners charged with providing medical services after a modest natural disaster.

The main findings, in summary, were that in the weeks after a cyclone a significant proportion of the population was suffering from neurotic and physical symptoms. No group escaped but the elderly and those who lost the most fared the worst. Race made no difference and these results were comparable to those found in studies of Caucasians. For most, the disturbance was transient and by three months morbidity levels had almost returned to control levels. A small number of individuals however remained severely disturbed and would probably require treatment.

REFERENCES

- Abrahams, M.J., Price, J., Whitlock, F.A. and Williams, G. (1976) *Med. J.Aust.* 2: 936-939.
- Andrews, G., Tennant, C., Hewson, D.M., Vaillant, G.E. (1978) Life event stress, social support, coping style and risk of psychological impairment. *J.Nervous & Mental Disease.* 166:307-316
- Bebbington, P., Hurry, J., Tennant, C., Sturt, E, and Wing, J. (1981). *Psychol. Med.* 11:561-579.
- Bennet, G. (1970) Bristol Floods 1968. Controlled survey of effect on health of local community disaster. *Brit. Med J.* 3:454-458.
- Boman, B. (1979) Behavioural observations on the Granville train disaster and the significance of stress for psychiatry. *Social Science and Medicine.* 13a: 463-471.
- Browne, M.L. & Krishna, R. (1983) Tropical cyclone Oscar, Preliminary report. Fiji Meteorological Service Publication 41/2/1.
- Crashaw, R. (1963) Reaction to disaster. *Arch. Gen. Psych.* 9:157-162.
- Edwards, J.G. (1976) Psychiatric aspects of civilian disasters. *Brit. Med. J.* 1:944-947.
- Goldberg, D. (1978) Manual of the General Health Questionnaire. NFER Publishing Companies. Windsor.
- Kinston, W. and Rosser, R. (1974) Disaster: Effects on the mental and physical state. *J. Psychosomatic Res.* 18:437-456.
- Leighton, A.H., Lambo, T.A., Hughes, C.C. (1963) Psychiatric disorder among the Yoruba. New York. Correll University Press.
- Leopold, R.L. and Dillon, H. (1963). Psycho-anatomy of a disaster: A long term study of post-traumatic neuroses in survivors of a marine explosion. *Amer. J. Psychiat.* 119:913-921.
- Parker, G. (1977) Cyclone Tracy and Darwin evacuees: On the restoration of the species. *Brit. J. Psychiatry.* 138:548-555.
- Patrick, V. and Patrick, W.K. (1981) Cyclone 1978 in Sri Lanka. The mental health trait. *Brit. J Psychiatry.* 138:210-216
- Price, J. (1978) Some age-related effects of the 1974 Brisbane floods. *Aust. and N.Z. J. Psychiat.* 12:55-58.

Tyhurst, J.S. (1951) Individual reactions to community disasters. Am. J. Psychiatry. 107:764-769.

Wyler, A.R., Masuda, M. & Holmes, T.H. (1971) Magnitude of life events and seriousness of illness. J. Psychosomatic Research. 33:115.

PEOPLE WHO EXPERIENCED DARWIN CYCLONE TRACY:

HUMAN RESPONSES

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Darwin's Population from 24th December 1974 and
Immediately Following

There is some inconsistency in published statements regarding Darwin's resident population as at December 1974 and the actual number of people physically in the city on the night of 24th December 1974 (Mitchell 1978 and 1981, Stretton 1975 and 1976, Darwin Reconstruction Commission undated). The following figures are a reasonable approximation of the population situation.

Regular residents 24.12.74		49,000
Absent on recreation leave, etc. 24.12.74		5,500
In Darwin night of 24.12.74		<u>43,500</u>
Evacuated by air	25,628	
Evacuated/Departed by road	<u>7,234</u>	32,862
In Darwin night of 31.12.74		<u>10,638</u>
In Darwin, 2nd January 1975		11,019

Comparison Groupings of Darwin People

Two groups of Darwin's residents (at 24th December 1974) experienced Cyclone Tracy in quite different ways. One group knew the fury of the storm and emerged from shelter on 25th December to see the devastation of their city and to guess at the extent of their own personal loss. The other group heard the story of the destruction of their city, hopefully yet fearfully guessed at the extent of their personal loss and (most of them) returned from peace, order and security to see the reality of the devastation and their loss. In this paper, for convenience, I shall describe these two groups: the former as INDARWINS (N=551), the latter as OUTDARWINS (N=101). The responses of people in each of these two groups to Tracy and to resettlement after Tracy, might be expected to be different.

Other groupings of Darwin's people used in response comparison pairings in a follow-up study carried out six years after Tracy struck (Milliken, 1983) were: by ownership of dwelling by extent of destruction of dwelling, by evacuation or not after the cyclone, by marital status, by having or not having dependents in Darwin, by residence still in Darwin or residence elsewhere.

In this paper, the subgroups in these "conditions" are designated OWNERS (N=420)/NON-OWNERS (N=577), MAJORLOSERS (N=329)/MINORLOSERS (N=91) (major=house 40% or more destroyed, minor=less than 40% destroyed), EVACUEES (N=253)/NONEVACUEES (N=399) (the large number of people who left Darwin by road immediately after Tracy, frequently are not subsumed under the title 'evacuees'), MARRIEDS (N=511)/SINGLES (N=102) (this describes a person's defacto situation at 24th December irrespective of legal marital status or dependent children), DEPDARWINS (N=541)/NODEPDARWINS (N=112) and STAYERS (N=276)/LEAVERS (N=376).

Other "People" Groups

A powerful modifier of Tracy-triggered circumstances was the extent and nature of the human response from people who did not experience Cyclone Tracy. Members of the Commonwealth Government of the day, "Australian" officials of the Salvation Army and similar organisations, many members of the Defence Forces, the senior executives of Insurance Companies, the executive staff of the National Disaster Organisation, Canberra-based staff of a number of Commonwealth Departments and of the Cities Commission, some members of the Darwin Reconstruction Commission, Australia's people everywhere--the response of these groups was important in minimising for all Darwin's people the stress of the circumstances of the days of their greatest need. Despair was not a necessary concomitant of devastation.

Basic 'Response' Information

The Australian Housing Research Council commissioned the Darwin Post Disaster Housing Study (Report in two volumes released by the Council in November 1983). The section of the study Sociological, Psychological and Economic Effects of Rehousing Darwin's People, was commenced in January 1981. Just over 1000 of Darwin's 24th December 1974 residents responded to a preliminary questionnaire. Of these over 650 responded to a second questionnaire seeking a range of "response" information. The number of respondents to the questionnaire, at significant locations in January 1981, were:

<u>Location</u>	<u>Preliminary Questionnaire</u> % of N = 1010	<u>Main Questionnaire</u> % of N = 652
<u>Still in Darwin (STAYERS)</u>	(48)	(42.5)
At pre-Tracy address	20	18
Not at pre-Tracy address but in same suburb	4	3.5
In a different suburb	24	21
<u>Left Darwin (LEAVERS)</u>	(52)	(57.5)
Still in N.T.	3	2.5
In another State	49	55

(Comparison of the 1974 and 1980 electoral rolls revealed that 60% of Darwin's 1974 voters were no longer enrolled in Darwin.)

The information supplied by these respondents is the source of almost all of the person response findings reported in this paper.

Indicators of the Effects of Tracy

The questionnaire contained items aimed at registering the influence of Tracy and of the rescue/restoration and rehousing programmes on the persons affected directly by the cyclone. Nine personal self-assessment variables were used to cover the life-space areas of health, people support network, finance, living environment, and attitudes to living in Darwin. December 1974 and May 1981 assessments were sought. Assessments were sought also of assistance received, of feelings if out of Darwin on 24th December, of feeling after evacuation from Darwin, of rehousing/repair/rebuilding facilities, of feelings in respect of Cyclone Max (March 1981), of reasons for leaving Darwin. Cross-tabulations were made of STAYERS/LEAVERS as a dependent variable of the other comparison pairings. Cross-tabulations were made also of other factual variables with the "comparison pairings".

INDARWINS/OUTDARWINS

101 of the 652 Main Questionnaire respondents were OUTDARWINS. The composition of the INDARWINS and the OUTDARWINS is similar:

<u>Characteristic</u>	<u>OUTDARWINS</u> Percentages	<u>INDARWINS</u> Percentages
Sex - Males	50	49.3
Females	50	50.7
Age - 18 to 34 years	51.5	52.6
35 - 54 years	41.6	39.4
55 years & over	6.9	8.0
Marital Status - married	83.0	83.4
- single	17.0	16.5

Should the two groups prove to be different on the set of "response" variables, the differences could arise from one group actually sitting out the cyclone or from the other group experiencing the anxiety of uncertainty and the frustration of delay in returning, or from a mixture of both. Of the nine personal self-assessment variables assessed both as at December 1974 and as at April 1981, only one of the eighteen comparisons was significantly different:

Health Generally 1981 ($\chi^2 = 6.57$, $df = 2$, $p < 0.05$). The direction of the difference favours the INDARWINS. This one significant difference is notable, but it is insufficient to support the conclusion that sitting out a cyclone as against sitting waiting for possible "bad news" has a differential effect on people.

The responses on two other variables were tested; differences were not significant - the influence of Good (safe) Housing on the decision to leave Darwin or to remain, and the opinion expressed as to Help sought and the sufficiency of the Help given.

More OUTDARWINS than INDARWINS have left the city permanently but the difference in number is not significant at the 5% level. The pattern of reasons for leaving Darwin permanently given by those who left Darwin in 1975 was strikingly similar (the value of χ^2 with $df=4$ was only 1.29 whereas a value of 9.488 is required for significance at the 5% level). Rank order correlations between the two groups in respect of 20 personal reasons for leaving and in respect of 11 groupings of those individual reasons were .72 and .92 respectively. Responses of the two groups to the experience of Cyclone Max (passed just north of Darwin on March 13th, 1981) were not identical; but differences were not significant.

Some features of the responses of the OUTDARWINS seem worth reporting. Just over 50% cut their holiday short to return to Darwin. These are represented in the same proportion in both STAYERS and LEAVERS. 66 of the 101 reported their experiences with officials in seeking to return to Darwin:

Officials Unhelpful	16
Officials Just Doing their Jobs	18
Officials Helpful	32

91 reported their anxiety whilst awaiting return to Darwin in the following numbers:

<u>Experience</u>	<u>STAYERS</u>	<u>LEAVERS</u>
	N(%)	N(%)
Almost sick with worry	2(6)	4(7)
Worried but got on with what could be done	7(21)	20(34)
Accepted the uncertainty but pressed hard to get back	24(73)	34(59)
	<u>33</u>	<u>58</u>

There is no reason to believe that the anxiety of the waiting period increased the incidence of long-term anxiety or instability amongst OUTDARWINS.

OWNERS/NONOWNERS

62% of accommodation units in Darwin in December 1974 were privately owned. The survey included 66% (656 out of 997) of respondents occupying privately owned accommodation (houses, flats, units, caravans etc.) There were 420 of the 997 (42.1%) who were owner-occupiers, i.e. OWNERS. A difference in response to cyclone damage to accommodation units (to "own residence") might have been expected of OWNERS and of NONOWNERS.

Private houses were occupied 49.3% by OWNERS, 50.7% by NON-OWNERS. 45% of OWNERS left Darwin between December 1974 and 1981; 57.6% of NONOWNERS left Darwin in the same period. Of OWNERS-STAYERS, 61% were at their pre-cyclone address in 1981; 25% of NONOWNERS-STAYERS were, in 1981, at their pre-cyclone address.

81% of privately owned accommodation units were damaged to the extent of 40% or more. About the same proportion of "public sector" units were damaged to the same extent. Of 338 respondents who reported living on in their damaged residences (either with no break or a very short break after December 1974) 206 or 61% were OWNERS. of the 338, 174 or 51.5% were STAYERS, (42.5% of all 652 respondents were STAYERS.)

OWNERS were roughly proportionately caught up in the evacuation exercise: 39.9% of evacuees were OWNERS. (There were 42.1% of OWNERS in the prime survey sample.) Return to Darwin after evacuation and staying on was of the following order for the various groups considered:

	Evacuees Returned to Darwin	Returnees who became STAYERS	All Evacuees who became STAYERS
OWNERS	88%	62%	54%
NONOWNERS	57%	54%	32%

OWNING was certainly a predisposing factor for STAYING but is not shown to be paramount in determining STAYING or LEAVING, e.g. 54% of NONOWNERS RETURNEES became STAYERS.

MAJORLOSERS/MINORLOSERS

The extent of the damage to residence was not a determinant of STAYING or LEAVING:

	Respondents (N=420) REPORTING DAMAGE OF			
	Less than 20% (N=29)	20% to 40% (N=62)	41% to 80% (N=115)	81% & over (N=214)
STAYERS	59%	53%	65%	54%
LEAVERS	41%	47%	35%	46%

OWNERS were over-represented in the number of reports of residence damage and in order to include as many respondents as possible, several other "loss" areas were examined.

The situation was different for durable goods loss/damage.

Respondents (N=617) Reporting Damage

	<u>Little</u>	<u>Significant</u>	<u>Much</u>
STAYERS	55%	44%	31%
LEAVERS	45%	56%	69%

A change in individual Financial Position from 1974 to 1981 was reported by 270 STAYERS and 365 LEAVERS. They reported the situation in 1981 as:

Attributable Directly to Tracy

	<u>Better</u>	<u>The Same</u>	<u>Not as Good</u>
STAYERS (100%)	34	44	22
LEAVERS (100%)	28	42	30

Attributable to Rehousing

	<u>Better</u>	<u>The Same</u>	<u>Not as Good</u>
STAYERS (100%)	23	56	21
LEAVERS (100%)	17	53	30

More than 640 respondents reported on Insurance payouts and Government Compensation grants for the under-insured.

Percentages in the different categories were:

<u>Insurance</u>	<u>STAYERS</u>	<u>LEAVERS</u>
Insured	70%	70%
Not Insured	30%	30%
Claimed and Received:		
A fair deal	86%	77%
Not enough	9%	13%
A rough deal	5%	10%
<u>Compensation</u>		
Applied for	73%	79%
Not applied for	27%	21%
Applied and received:		
Reasonable help	61%	51%
Less than fair	36%	40%
None	3%	9%

In reporting their Financial Position in 1974 and in 1981 respondents were significantly different as between STAYERS and LEAVERS:

Financial PositionPERCENTAGES

	<u>STAYERS</u>		<u>LEAVERS</u>	
	<u>'74</u>	<u>'81</u>	<u>'74</u>	<u>'81</u>
Reasonably Good	55	50	66	51
Fair-getting by OK	41	38	31	37
Just holding, or hopeless	4	12	3	12

EVACUEES/NONEVACUEES

Of the 250 EVACUEES reporting some residence damage, 59% were back in Darwin by 30th June 1975; and of the remainder, 30% did not return to Darwin at all.

82% of NONRETURNEES said that they fitted into living elsewhere, that they were concerned about Darwin but they would wait and see what happened. (8 of these people were OWNERS and another 5 had been negotiating to buy.) 76% of RETURNEE-STAYERS and 60% of RETURNEE-LEAVERS reported themselves as uneasy, unsettled and anxious to get back to Darwin.

EVACUEES as a group had a quite different composition from NONEVACUEES in respect of Sex, Age and Marital Status. Therefore, comparisons of responses of the two groups, to the same situation generally cannot be valid. One observation is worth making: when the accommodation situation was at its lowest ebb in Darwin (1975) the greatest annual outflow of RETURNEES took place; but in that year the proportion of all permanent departures was less for RETURNEES than for NONEVACUEES.

It is difficult to compare the University of Queensland 1975 Tracy Study with the 1981 Rehousing Study in respect of the evacuation of Darwin. Just under one third as many people left Darwin in their own transport immediately after the cyclone, as left by air in the "Evacuation" exercise. No one was forced to leave but women and children were strongly encouraged to leave. Many husbands drove with families to a "rescue" location, "deposited" their families and returned to employment in Darwin. Many of the respondents from this group would not appear as EVACUEES in the Rehousing Study; but they would have been in the target group for the University of Queensland study.

The evacuation exercise as such seems not to have been a cause of great distress. The distress arose from the frustration of being unable to exercise the right of return because the rehousing programme did not move fast enough. It is likely, that longer-term adverse psychological effects on EVACUEES, attributable directly to evacuation were small, perhaps even negligible.

References

- Darwin Reconstruction Commission 1st Annual Report, 1975.
Darwin: Author, Undated.
- Milliken E.P. 1983. Sociological, Psychological and Economic Effects of Rehousing Darwin's People after Cyclone Tracy. In Australian Housing Research Council Darwin Post Disaster Housing Study Vols 1 & 2. Woden, A.C.T.: Author.
- Mitchell W.H. 1978. Northern Territory Statistical Summary, 1978. Darwin: Australian Bureau of Statistics.
- Mitchell W.H. 1981. Northern Territory Statistical Summary, 1981. Darwin: Australian Bureau of Statistics.
- Stretton A. 1975. Darwin Disaster: Cyclone Tracy, Report by Director-General Natural Disasters Organisation on the Darwin Relief Operations 25 December, 1974 - 3 January, 1975. Canberra: Australian Government Publishing Service.
- Stretton A. 1976. The Furious Days: The Relief of Darwin. Sydney: Wm. Collins.

THE SOUTHLAND FLOOD

AN ORGANISATIONAL APPROACH TO DISASTER RECOVERY

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INTRODUCTION

A disaster seriously disrupts the personal, social, economic and political interactions of the individual and family. Such disruption places the individual and family in unfamiliar stressful situations, as they attempt to gain assistance and find solutions to the numerous problems that confront them. Disaster relief for the individual involves a large number of organisations and departments.

Since the first Civil Defence Act in 1962, civil defence responsibilities in New Zealand have terminated once the threat to life had diminished. With no organisations to coordinate the post disaster recovery, the stress placed upon the individual and family increased considerably as they tried to get the necessary assistance through a myriad of private aid groups, government departments and insurance groups.

With these problems identified the Civil Defence Act 1983 made provision for the coordination of those agencies involved in disaster relief and recovery. The Southland flood of January 1984 was the first opportunity for the new legislation to be used.

This paper provides a synopsis of the Southland flood and sets out the organisational approach that was adopted for relief and recovery in the affected communities.

Currently, a research programme is being developed to examine human behavioural aspects of the disaster, in particular the long-term effectiveness of the organisational response to the disaster. From the results it is hoped to improve the disaster recovery capabilities of civil defence organisations and government departments.

Introduction to Civil Defence in New Zealand.

"Civil Defence" is defined as measures necessary for public safety, designed to prevent, reduce or overcome the effects of earthquakes, explosions, floods, storms, tsunamis, land movement or the spillage of dangerous gases or substances.

Civil defence is the responsibility of local and regional government, central government and all government departments. All these agencies must plan for their use in a civil defence emergency.

A civil defence emergency is normally only declared when the resources of the emergency services are unable to cope with a situation that threatens public safety.

New Zealand has had an Act of Parliament covering civil defence since 1962. The Act sets out the statutory structures, powers and responsibilities of government during a state of civil defence emergency. In December 1983, amendments to the Act were consolidated and new sections added to produce the Civil Defence Act 1983. The new Act made special provision for the disaster recovery phase to ensure the efforts of the community and government agencies were coordinated, thereby assisting the disaster victims re-establish their lives.

THE SOUTHLAND FLOOD

The Southland flood was the first opportunity to use this section of the Civil Defence Act 1983. The flood was the largest disaster in New Zealand since the devastating Napier earthquake in 1931. An estimated 5000 people evacuated their homes and \$50 million worth of property was damaged. Many of the evacuees were able to return to their homes within a short time. Unfortunately, for some 1400 evacuees whose homes were inundated, caravans, rented homes and billets have had to suffice as they await the rebuilding or restoration of their homes.

Background

On 26-27 January 1984 a low pressure weather front passed slowly over the southern part of the South Island. During a twenty-four hour period, rainfall in the Southland Catchment ranged between 600mm in the hills and 143mm in Invercargill City (population 49,000).

As a result of this intense rainfall, the rivers throughout Southland overtopped their banks. The Makarewa River ran six metres above normal and just below its confluence with the already swollen Oreti River breached the stopbanks flooding the Invercargill suburbs of Otatara, Grasmere, and parts of Invercargill Airport. (Map 1).

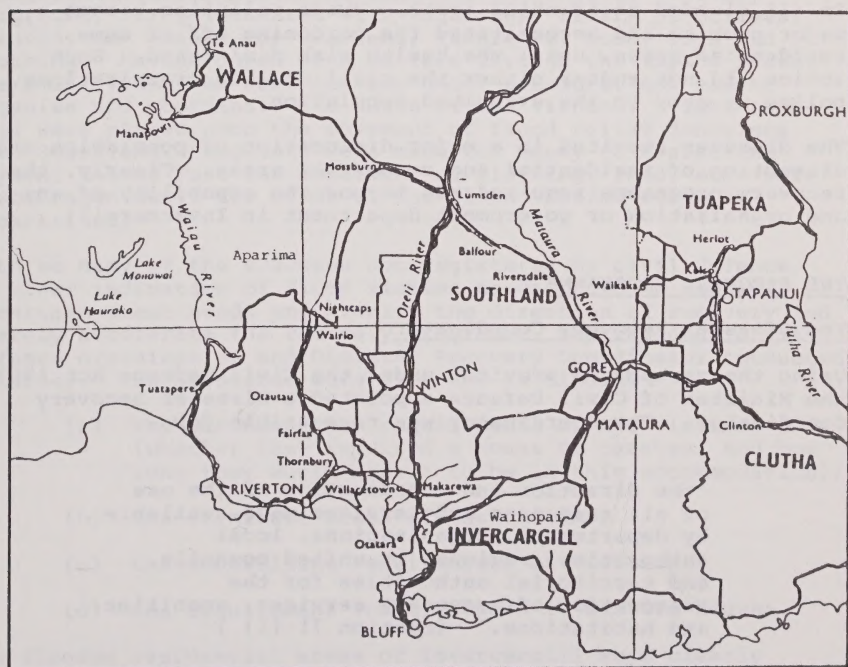
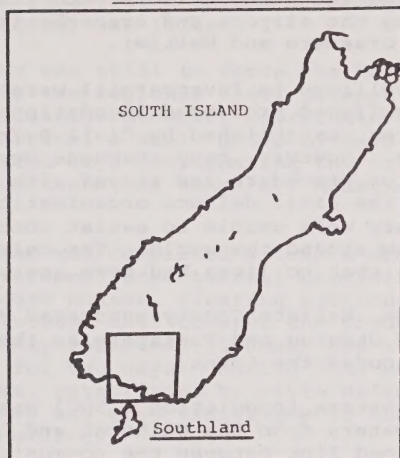
Floodwaters from the Waihopai River affected the northern residential areas of Waikiwi and Thompsons Bush, while the swollen Otapuni Stream, effectively cut Invercargill in two causing extensive damage to the commercial and industrial areas of Invercargill.

A state of local civil defence emergency was declared at 0400 hours on 27 January. This was extended to a state of regional civil defence emergency at 1000 hours because of widespread, serious flooding in the rural towns.

The local and regional civil defence organisations responded accordingly providing public information, rescue teams, evacuation and welfare centres, and catering teams to ensure the needs of evacuees were met.

Map 1

THE SOUTHLAND REGION



At 2000 hours on 27 January, the flooding problems increased as the high tide caused the Waihopai to breach its stopbanks completely flooding the airport and exacerbating the flooding in the suburbs of Grasmere and Waikiwi.

A total of 1205 dwellings in Invercargill were affected by the floodwaters, 730 suffered prolonged inundation. Official registration centres, established by Civil Defence, registered over 1700 evacuees. However, many evacuees bypassed the civil defence registration procedure and stayed with friends and relatives. Since the civil defence organisation had no record of these people they were unable to assist concerned relatives who telephoned from around the world. The only assurance that could be given was that no lives had been lost.

In Southland region, Wallace County evacuated 860 people from the small towns of Otautau and Tuatapere as the Aparima River and Waiau River flooded the towns.

The community of Otatara (population 2,500) was completely isolated as floodwaters from the Waihopai and Oreti Rivers covered the only road link between the community and Invercargill.

In all flooded residential areas, sewage pollution became a major problem and necessitated the cordoning off of some residential areas, until the health risk diminished. Such action did not endear either the civil defence organisations, police or army to the evacuated population.

The disaster resulted in a major dislocation of population and disruption of residential and commercial areas. Clearly, the recovery programme required was beyond the capability of any one organisation or government department in Invercargill.

THE RECOVERY PROGRAMME

The Disaster Recovery Coordinator

Using the new powers provided under the Civil Defence Act 1983, the Minister of Civil Defence appointed a Disaster Recovery Coordinator. The Coordinator was responsible for -

"the direction and coordination of the use of all resources and services made available by departments, organisations, local authorities, regional or united councils, and territorial authorities for the restoration of necessary services, amenities and habitations." (Section 71 (1))

From his appointment on the third day of the emergency, Mr R.T.

Baines (Resident Engineer, Ministry of Works & Development), initiated the formation of committees that would deal with the housing, food, and financial problems of the evacuees, once the civil defence emergency was lifted.

While the emergency was still in force the needs of the evacuees were coordinated by the regional civil defence organisation, in liaison with the Disaster Recovery Coordinator. The civil defence welfare section, a small group of devoted people, worked non-stop for fourteen days coordinating the 'clean-up' resources, finding billets, caravans and temporary housing for flood victims.

The 'clean-up' phase was completed within a short time, the community (and government departments) providing assistance, gutting flood-damaged houses, clearing sections and distributing lime over the raw sewage that covered the ground. Most services were quickly restored, although the airport was to remain inoperable for ten days. During this period, the information centres, established by civil defence, gave advice on insurance matters and gave assistance to those seeking professional counselling.

The welfare section bore the brunt of the initial recovery programme, being inundated with enquiries, offers of billets, caravans and houses for evacuees, furniture, food, toys and clothing. Having coped with welfare through the impact phase, the small team, who were already under pressure, now had to organise and coordinate the needs of the victims. Tight controls were placed upon the movement of flood relief donations into Southland. Requests were made for money to assist the Mayoral Relief Fund and donations of clothing, food, etc. were discouraged until the needs of the flood victims could be ascertained.

With so many of the evacuees not registered by civil defence, no clear indication of flood victims needs could be gauged. To ascertain these needs and clarify the direction of recovery and thereby accelerate the recovery programme, the regional civil defence organisation and Disaster Recovery Coordinator conducted a survey. The questions were directed at finding -

- (a) the accommodation requirements of the victims (whether they required a house or caravan, and how long they would expect to be in this accommodation);
- (b) the furniture needs of the victims;
- (c) the counselling requirements of victims;
- (d) the requirement for tradesmen to restore houses.

The flooded residential areas of Invercargill were clearly defined, so eighty trained volunteer counsellors were sent to interview people. Since few residents were able to occupy homes, residents had been advised through the media to go to their properties to assist in the completion of the survey. Over 750 residents were interviewed.

Within twelve hours of the survey being completed, some provisional results were available to the civil defence organisation as the data had been programmed into the Invercargill City Council computer. The computer output provided valuable information to the civil defence organisation and the Disaster Recovery Coordinator, who were then able to send trained counsellors to people who required assistance, provide housing or caravans for people still billeted with friends, and get some indication of the furniture requirements of victims. Later, the survey was extended to cover the rural areas affected by the flooding.

The survey was designed quickly, and as a result the information gained was often not as specific as would have been desired. As a consequence, a small force of workers was employed to extrapolate and expand on information gained.

The Disaster Recovery Coordinator, assisted by the Invercargill City Engineer, Building and Health Inspectors, also undertook rebuilding resources survey and prepared estimates on the amount, type, and availability of building materials required for the restoration of damaged houses.

Accordingly, members of the Master Builders Federation, Builders Hardware Association and Builders' Supply Merchants were notified to ascertain the availability of material and tradesmen. These organisations reported they could provide the necessary materials and tradesmen to cope with the major recovery programme. Unfortunately, this has not proved correct, and as a consequence the rebuilding programme will not be completed by winter, leaving many families in temporary accommodation for some months to come.

Apart from the surveys, the Disaster Recovery Coordinator organised committees to deal with the welfare, housing, food and furniture needs of flood victims once the emergency was lifted.

Welfare Committee

Representatives of the Department of Social Welfare, the Southland Council of Churches, Presbyterian Social Services, Psychological Services, City Council representatives, Southland Hospital Board and the Health Department were called together to form a Welfare Committee.

The committee was tasked with -

- (a) the coordination of all welfare activities as required by flood recovery operations;
- (b) counselling and support of flood victims referred to them by local authorities;

- (c) direction and advice to other committees in regard to the distribution of goods and accommodation; and
- (d) the maintenance of sufficient records to allow follow-up action and on-going support.

To carry out these tasks, a Flood Recovery Welfare Coordination Centre was established to coordinate the counselling services of the Social Welfare Department, and involved both professional counsellors and psychologists and volunteers from church organisations. Budgetary and marriage guidance advisors were also made available.

Accommodation

A Temporary Accommodation Committee was constituted by the Coordinator to deal with the housing needs of the victims. Sponsored by the Housing Corporation, the committee was responsible for -

- (a) monitoring and maintaining registers of caravans, houses and billets; who they were allocated to; and a register of caravans still available;
- (b) Monitoring the quality of house repairs; the costs and giving advice on repair matters (the primary responsibility for this was given to the Housing Corporation).

Legal tenancy agreements were drafted by the Invercargill City Council and Civil Defence, for the renting of houses and caravans. Financial assistance for accommodation and billets were met by central government, through the Department of Social Welfare.

Early on in the emergency it was found that billets were an unsuitable long-term accommodation solution. Personal conflicts and family problems caused by the floods were often compounded in a billeting situation. Accordingly, people were provided with a house or caravan accommodation. Most caravan occupiers located themselves on their own properties and began work on rebuilding their homes.

Smaller committees were also established to deal with the distribution of toys, food and clothing to flood victims.

Liaison and information flows between the civil defence organisation and the Disaster Recovery committees was essential if the committees were to function effectively once the state of emergency was lifted. Survey results were made available to organisations appointed to the committees to indicate the problems being encountered and the resources required.

With the lifting of the civil defence emergency on 15 February, responsibility for assisting disaster victims previously undertaken by civil defence was assumed by the local government organisation, Invercargill City Council and the Disaster Recovery committees. To ensure that liaison was maintained between local government, the Flood Recovery committees and disaster victims, a Flood Relief Officer was appointed by Invercargill City Council.

The Disaster Recovery Coordinator continued to assist the City Council and to monitor the work of the Disaster Recovery committees until 11 March 1984.

These committees will remain in operation for many months, particularly the welfare and accommodation committees. The welfare committee is maintaining its Flood Recovery Welfare Coordination Centre and providing professional counselling to flood victims. The housing problems will be an on-going matter. Already problems and delays are being experienced in rebuilding and restoring properties. However, where work is being done the Housing Corporation are closely monitoring the quality and cost of rebuilding work to ensure the victims do not suffer further from expensive or poor quality restoration work.

CONCLUSION

The recovery programme instigated after the Southland flood may appear to have run smoothly, but in fact it did not. Personalities within organisations clashed, organisations were unsure of their responsibilities and the flow of information to organisations and the public was sometimes irregular, incomplete and wrong. However, despite these problems, a structural organisation was established which greatly assisted the recovery of the Southland community. The problems of the flood victims are being dealt with and disaster victims know where assistance and advice can be sought.

Early indications are that the Disaster Recovery concept worked effectively and the value of establishing an umbrella organisation to deal with the long-term requirements of disaster victims was shown. However, more research on these matters will be undertaken. As a result of this research, it is hoped the disaster recovery function will become a separate national civil defence plan, which will provide guidance to local and regional government organisations and Government departments in providing for disaster recovery.

THE ROLE AND REACTIONS OF A MENTAL HEALTH TEAM

INVOLVED IN THE VICTORIAN BUSHFIRE AFTERMATH*

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SUMMARY

The reactions of a volunteer mental health team which convened in the aftermath of the 1983 Ash Wednesday bushfires are reported. A questionnaire designed to explore psychological and physical responses was completed by all of the 19 staff who made up the team. Using both open ended and closed questions, the questionnaire tapped such areas as motivation, goals, expectations and observations, initial and later emotional and physical reactions, fantasies and evoked memories; an evaluation of the service and the experience was also included.

Analysis of responses indicated that team members experienced considerable stress during their post-disaster work but also gained a great deal on both professional and personal levels. Sources of stress are discussed as are recommendations for their alleviation.

* A revised version of this paper will be published in the Australian and New Zealand Journal of Psychiatry in December 1984. The revisions reflect a critical review of our data and interpretations.

The disaster which provided the impetus for this study was the Ash Wednesday (February 16th, 1983) fires that swept through certain areas of Victoria and South Australia. This disaster made world headlines, was covered extensively by the media, via newspaper articles and, more particularly, television documentaries portraying dramatic scenes of the fires, the devastation and their effect on the local people.

There was immediate and widespread community response to this disaster, in all forms. Australians are known for their generosity and willingness to assist those who have suffered. The name "the lucky country" also implies that Australians are geared to the "unlucky", and there is often a rush to respond, once the need is known and advertised.

The Macedon area of Victoria is composed of the townships of Gisborne, with its component of factories, businesses and trade, Macedon, lying at the foot of the mountain, an attractive town or village with its own style and country atmosphere, and Mount Macedon, known as "the Mount". This was the home of several of Victoria's wealthy and influential families who owned splendid houses set in beautiful gardens. Some were classified under the National Trust and were open to the public at certain times of the year, so that the burning of these homes represented a national as well as a personal loss.

The particular feature of the bushfire in this area was the enormous number of homes that were lost (approximately 450), the devastation of the countryside, but the relatively small number of seven deaths, all in the elderly age group. Similarly there were only a few who suffered serious injuries or burns. The emotional trauma that was experienced by the vast majority of the community related to the evacuation of about 5000 people, and the escape from the horrendous fires to areas of comparative safety. Many families went first to one home or centre and then, as the fires drew closer, to another as the necessity to move again was apparent. It should be noted that we were told innumerable times that the fires in the district occurring on February 1st, 16 days earlier, which caused the loss of 24 homes and much of the bushland, cleared the way for the community to make its escape over the mountain. Nearly all retreated by car, and we learnt of families driving with virtually no petrol, of engines burning hot or stalling, and of the occasional accident, where a driver was unable to see because of the blinding smoke.

Listening to these real life stories, we were invariably aware of the fear, the tremendously heightened emotion experienced under conditions of severe stress, of the excitement, particularly as described by children, and of the enormous relief at being alive, at being reunited with one's family, of

finding that nearly all one's friends had also survived. We were also made aware then and later that the lack of communication by those responsible for alerting the public to the danger was regrettable. Some families only escaped because their neighbour warned them, others were given 2-3 minutes to pack and go. The State Emergency Service and the Country Fire Authorities working through the night were, we believe, not able to meet the effect of the most extraordinary weather conditions, the blasting furious north winds, the sudden changes of direction of these winds which caused flames to leap to heights of 200 feet and fire bombs hurtling through the air at unbelievable rates. It was for a few hours a holocaust, a time of intense heat, danger and grave concern.

This paper describes the actions, reactions and resulting recommendations of a team of mental health workers which convened to provide services to Macedon and Mt Macedon victims of the Ash Wednesday bushfires.

OUR ACTIONS

The volunteer multi-disciplinary team, made up primarily of staff from Prince Henry's Hospital, Melbourne, first met on the day after the fires at the instigation of the third author. He and the senior author had a previous interest in the psychological effects of trauma and disasters, had participated in a disaster exercise and had made a video tape describing common reactions of disaster victims and rescuers.

The team felt strongly that intervention should take place as early as possible and was frustrated during the period immediately after the fires that its offers of assistance were not immediately accepted by the mental health bureaucracy. One team member had talked to a colleague with property in the Macedon area; he recommended that the team not wait to be called but simply go. Thus, four days after the fires, five team members went to Macedon. They talked their way through the various barricades, chatted with people that they met on the streets, and set up links with the local general practitioners and hospital.

On that very first visit to Macedon, the team members took with them some copies of a pamphlet describing common reactions to disasters and ways of coping with these. As initial reactions to the pamphlets were very positive, more of these were run off for immediate use and an illustrated pamphlet, "After the Crisis is Over", focusing on children was developed by the second author. (Indeed, within a few weeks, over 10,000 pamphlets had been distributed by the Health Commission of Victoria to the various bushfire areas).

During the following week, the team's presence in the community was established through negotiations with the general practitioners and hospital, and contact with representatives from Community Welfare Services and the Health Commission. By the

end of that week it had been decided that our team and one from a State psychiatric hospital would each provide personnel for a joint service, the latter having the ultimate authority. A caravan would be set up at the Gisborne Shire Offices (about 10 kilometres from the Macedon area) where victims had to come for disaster relief. The caravan was to be called the Stress Counselling Service. It was also decided that personnel would be available at the hospital for two hours each day so that general practitioners could schedule people to see them.

Already at this stage, some conflict was becoming evident about the way in which we should go about our work. The general practitioners, for example, were insistent on a traditional, hospital based model where they could refer "patients". One step removed from this was the caravan based model. This, however, still required disaster victims to make the first step in approaching a counsellor. Again, it was based on the assumption that referrals would come in, though the network for receiving referrals was widened to include various social service agencies, teachers, and community leaders.

Our knowledge of disaster work indicated that the basic principles of immediacy, proximity and flexibility be instituted in this disaster, as in other disasters. These principles were a natural extension of the ethos of liaison psychiatry practised by the Prince Henry's Hospital team of reaching out to populations in need rather than waiting for their arrival which may never eventuate.

We thus started visiting people in their houses or in their caravans, always receiving a very welcoming reception, and invariably being given the names of friends and relatives who were also thought to need the opportunity to talk through their experiences. This process continued for about four weeks during which team members estimate they talked with about 450 individuals and families. Contact was also made with various groups in the area, such as the local counselling and guidance services, teachers and various women's groups.

The conflict concerning the degree of formality or informality of the service provided escalated, and finally our team was requested to leave the area. Perhaps these events can only be understood in the context of the lack of clarity in the State disaster plan concerning mental health intervention, personal and team rivalries, and current political issues.

OUR REACTIONS

Taylor (1982) used the term "tertiary victims" of a disaster to refer to "those whose occupations and duties require them to respond to any major alert in the community and to assist

with any subsequent rehabilitation and restoration work". In recent years, a number of writers have started to focus on this group and there is some indication in the literature that tertiary victims are themselves a vulnerable group.

For example Frederick (1977) notes that "personal contact with officials and crisis workers in -- recent disasters -- have (sic) highlighted the need for support of the mental health crisis workers themselves. Under such pressure, physical exhaustion inevitably takes it toll, along with the added ingredients of emotional stress and trauma. It often becomes necessary for workers to wear many hats, so to speak, by engaging in numerous activities which transcend the specific areas of expertise and training for which they have been oriented". Lindy et al (1981) observed that "A frequent cycle seemed to plague those of us working in outreach: resistance, zeal, over-extension, frustration, and anger". Raphael (1977) notes that feelings of helplessness and frustration are common in rescue workers and that anxiety, anger and horror may need to be worked through at a later date.

Perhaps the most extensive work in this area is that reported by Taylor (1983) and Taylor & Frazer (1982). In discussing questionnaire and interview data on the body handlers after the Mt Erebus plane crash, Taylor notes "everyone complained of physical fatigue and many of melancholy moments during breaks in their work. 81% reported changes in their appetite; 85% in their sleep; about half reported changes in their feelings and their need to talk; and one-third reported a change in their social activities. After 28 days, the appetite and sleep reports were much the same, changes in feelings and activities increased, and the need to talk diminished". Other symptoms which emerged included bad dreams, sleep disturbance, and tension. At the 20 month follow-up "only 8 of the 100 continuing respondents expressed the need to talk over their experiences. Eighty considered that they had overcome any problems quite satisfactorily, but 15 others still had occasional and isolated "flashbacks" in which emotionally charged episodes returned to them momentarily. Three of the 15 reported general emotional problems as well as the "flashbacks" (Taylor & Frazer, 1982). Five expressed anger that seemed out of proportion to the events they described, and four mentioned their marital troubles. One reported having undergone "a complete personality change" and another having become "more solitary with a cessation of sexual activity".

Raphael et al (1983-84) have also recently published a study focusing on the effects of disaster work on the helpers. Their questionnaire survey of about half of the rescue, organizational, support and medical personnel involved in rescue work following the Granville rail disaster revealed that almost all found the experience stressful, 70 per cent expressed evidence of some strain, and about a quarter had symptoms of anxiety, depression, and insomnia in the months after the disaster. On

the other hand, the authors note that "the experience of working in a disaster can have enriching effects as described by 35 per cent of the respondents who felt more positive about their lives as a result of their involvement in the disaster".

THE QUESTIONNAIRE

With the aim of exploring the issue of helper reactions, a questionnaire was distributed to the 19 members of the Prince Henry's team.* All 19 questionnaires were filled out anonymously and returned. It should be noted that this research was exploratory in nature. The participants had widely varying experiences in Macedon and had, in fact, spent very variable amounts of time there. They included ten males and nine females, seven psychiatrists, five psychiatric registrars (all but two in senior years), four psychologists, two nurses and one social worker. Nearly all had at least some experience in disaster work or bereavement counselling.

The questionnaire consisted of both closed and open ended questions. In addition to demographic data, the major areas covered were helper motivation, goals, expectations and observations, initial and later emotional and physical reactions, fantasies and evoked memories, and an evaluation of the service and experience.

Questionnaire Results

Motivation : In response to a list of possible factors contributing to team members' decision to join the team, 18 of the 19 volunteers indicated that feelings of compassion played a considerable or moderate role. Seventeen indicated a similar role for interest and/or skill in crisis intervention and 16 noted a considerable or moderate desire to learn about disasters and their effects. Twelve team members noted a considerable or moderate desire to be in the action and the same number a personal need to accept responsibility for psychiatric stress.

Therapeutic Goals : Thirteen of the 18 team members who responded to an open ended question concerning goals noted abreaction and ventilation. The provision of support was indicated in eight team members' responses, and prevention of future psychiatric distress by six respondents. Four noted identification of victims needing more intensive intervention as a goal.

Expectations and Observations : In order to assess stress on team members, open ended questions were asked about expectations and observations of both the countryside and disaster victims,

* Copies are available from the senior author

and responses analysed for discrepancies. For eight, observations of the countryside were worse than expectations, for six, they were not as bad and for five, there was no discrepancy. Of interest is the fact that thirteen of the nineteen used the word "devastation" in describing their expectations and observations.

Only three respondents felt that their observation of victims were what they expected and all of these answers were qualified. Whereas nine team members expected to see shock, only three observed it; similarly, fourteen expected grief, sadness, depression and distress, but only seven observed these. On the other hand more team members observed manic behaviour than had expected it (seven versus three), and similar responses were noted for anger (five versus three).

Emotional and Physical Reactions (at first encounter and after 3-4 visits): In describing their first reactions in their own words, most team members gave strongly worded responses. For example, one noted "feelings of awe at the change in the countryside, as though I was being 'hit' by those dark, burnt trees" while another wrote "I was shocked, very sad, speechless initially, very upset". In response to a list of possible emotional reactions at first encounter, over two-thirds of the team members indicated that they experienced the following to severe or moderate degrees :

1. shock/bewilderment;
2. dependency/need for team support;
3. confusion/uncertainty;
4. depression/sadness;
5. helplessness.

Anxiety/distress, euphoria/excitement and anger/rage were noted by only a few. Two-thirds indicated severe or moderate fatigue, and one-third disturbance of sleep patterns and increased muscle tension. Other physical reactions, such as restlessness, headaches, stomach and bowel upsets, were relatively uncommon.

After 3-4 visits, emotional and physical reactions had decreased. Depression or sadness was still of moderate intensity in eleven team members as was dependency and need for team support. Ten noted that they still experienced severe or moderate fatigue.

In addition, nine indicated that they had become ill during their disaster work (usually colds and influenza), five had car, and three, domestic accidents, and eight felt their eating, smoking and/or drinking habits changed.

Fantasies, Thoughts and Dreams: In response to open ended questions, seven team members reported dreams or thoughts of themselves in the fire situation. A similar number described earlier traumatic experiences that were reactivated. For example, one person "kept thinking of my experience in the war, especially travelling home and wondering if our family home had been bombed".

Evaluation of the Service: All 19 team members thought the service they provided was helpful, eight to a considerable extent, eight to a moderate extent and three a little. In response to an open ended question concerning how the service was helpful, 10 team members stressed the provision of support, mainly through empathic listening. Eight team members felt that allowing ventilation and catharsis was of assistance.

Most team members experienced no difficulties in working with other organizations in the community. There were, however, many difficulties in working with the other mental health team. Nine of the Prince Henry's team assessed these as "considerable" and another five as "moderate" in degree. These were attributed to two major factors : seven team members pointed to the disruptiveness of differing philosophies or conceptual frameworks, and seven to the detrimental effects of professional rivalry and jealousy.

Personal Evaluation : Team members were asked to fill in a check-list concerning their evaluation of emotional, educational and social aspects of their experience. Almost all (18) found the experience to be emotionally valuable to a considerable or moderate extent. Most, however, also found it considerably or moderately frustrating (13) and stressful (9). Eight noted that the experience was depressing.

Most indicated that they had learned to considerable or moderate degrees about the effects of disaster (18), stress counselling (15), the local community (15) and organisational/administrative issues (12).

15 respondents indicated that they had gained from personal contacts with other team members, and 12 from contacts with members of the community.

Of the 17 respondents who answered the question, 14 indicated that the experience gave them new insights into their conceptual thinking about their professional work. For five, this was an increased appreciation of the value of community work, while four noted the value of seeing the evolution of post traumatic neuroses.

Ten of 16 respondents indicated that the experience gave them new insights into their own personalities. There was little uniformity in description of these.

DISCUSSION OF QUESTIONNAIRE RESULTS

While the limited sample size and varied experience of the team members may impose limitations on the generalizability of the questionnaire data reported here, it is felt that the 100% response rate and care taken in completing the questionnaire lend considerable validity to the conclusions which may be drawn concerning the experience of a volunteer mental health team working in the immediate aftermath of a major disaster.

Motivation to become involved in this type of work was, for the most part, attributed both to professional factors (desire to provide a service, gain experience and learn about disasters and crisis intervention techniques) and the humanistic motive of compassion. This latter was powerfully evident in the whole community, both in and outside the fire affected area and suggests a need for further research into the altruism, compassion and dedication that are observed following a disaster.

Therapeutic goals were those expected from professionals working in the disciplines of psychiatry, psychology, social work and nursing. It was believed that assisting the ventilation of the emotional shock, by facilitating abreaction and providing support, would be beneficial. Although only six members noted that their goal was the prevention of future psychiatric distress, this was accepted as the "raison d'être" of the team's involvement in the disaster.

The questionnaire responses provide evidence of the impact on both emotional and physical health that the disaster work had on the team. The large majority felt shocked, confused, saddened and very tired. About half became ill, had accidents and/or noticed changes in their eating, smoking or drinking habits. They recognised feelings of helplessness and the need for team support. It is important that this finding be acknowledged so that supportive networks are provided for the helpers from outside the disaster-affected area, as well as those living and working in the community. The fact that 16 out of the 19 members were either psychiatrists or psychologists shows that even those with lengthy training and considerable experience of psychological trauma found they were considerably stressed. It is our impression, furthermore, that those of the team who gave the most of their time and energy experienced the most personal stress, an observation which highlights the importance of scheduling adequate rest periods for disaster workers.

Sources of stress were numerous and varied. While about half the team found the burnt out countryside to be worse than they had expected, their observations of the victims were the opposite. This is an important finding and may reflect the fact that no member of our group visited the area in the first three days after the fires. On the other hand, it is more likely due to ignorance about the actual behaviour of disaster victims. Other researchers have also commented on their failure to observe

the commonly expected major emotional shock, psychological dysfunction and mental illness immediately following disasters (Quarantelli & Dynes, 1977; Taylor, 1977). As discrepancies between expectations and observations can impede efficient functioning, volunteers for a mental health team such as the one described here clearly must receive training based on available research concerning phases of reaction in disaster victims. The actual devastation was made "alive" by the graphic descriptions and vivid emotions of the affected people. Later came frustrations and feelings of inadequacy to deal with a mammoth task. Outreach work, in spite of the great willingness, sensitivity and increasing adeptness of technique among team members, was also stressful for those not accustomed to it. In the absence of clear and shared role definitions on the one hand, and of a therapeutic contract (e.g. appointments, time limits, fees, etc.) on the other, intense and intimate engagements with distressed victims often taxed all the empathy, emotional resources and therapeutic skill of helpers. Again, specific training in a conceptual framework and model of intervention suited to disaster work would seem necessary.

The experience, not surprisingly, reactivated previous traumatic experiences and produced much thinking and daydreaming and some nightmares about fires and escape. This is a common experience; even in the sheltered environment of a professional office, patients dramatically recalling and abreacting traumatic events produce in the therapist's mind memories or dreams, particularly if the events described "touch on" experiences with similar emotions.

Finally, the difficulties in working with the other mental health team were for some the most stressful part of the whole experience. While this type of conflict has been described in the literature (Zurcher, 1968; Heffron, 1977) and was present following the bushfires in other post-disaster relief organisations, a priority must be given to the development of methods for circumventing it. In addition to the deleterious effect on the team, community members were well aware of the conflicts and even a year later express irritation if not anger about them.

We feel that if team members had not often worked in pairs, ventilated to each other and had regular debrief sessions, the effects of stress might have had greater impact. In addition, it must be remembered that, as found by Raphael et al (1983-84), the experience proved both valuable and rewarding, with learning taking place on both professional and personal levels, and this no doubt also served to counteract the stresses and frustrations.

Finally, there were hidden rewards to the work which were not evident until months later. The need and seeking out of team support as a healthy exercise lead to improved staff relationships in some instances and friendship bonds were made or strengthened. Like the police, ambulance and fire officers, the development and promotion of "mateship" as it is known in this country is an essential part of the experience and necessary to those working in disaster situations.

REFERENCES

- Frederick C.J. (1977) Current thinking about crisis or psychological intervention in United States disasters. Mass Emergencies, 2, 43-50.
- Heffron, E. (1977) Interagency relationships and conflict in disaster: The Wilkes-Barre Experience. Mass Emergencies, 2, 111-119.
- Lindy, J.D., Grace, M.C., and Green, B.L. (1981) Survivors: Outreach to a reluctant population. American Journal of Orthopsychiatry, 51, 468-478.
- Quarantelli, E.L. & Dynes, R.R. (1977) Response to social crisis and disaster. Annual Review of Sociology, 3, 23-49.
- Raphael, B. (1977) The Granville train disaster : Psychological needs and their management. Medical Journal of Australia, 1, 303-305.
- Raphael, B., Singh, B., Bradbury, L., and Lambert, F. (1983-84) Who helps the helpers? The effects of a disaster on the rescue workers. Omega, 14, 9-20.
- Singh, B. and Raphael, B. (1981) Post disaster morbidity of the bereaved: A possible role for preventive psychiatry? Journal of Nervous and Mental Disease, 169, 203-212.
- Taylor, A.J.W. (1983) Hidden victims and the human side of disasters. UNDRO News, March/April 1983, 6-12.
- Taylor, A J W and Frazer, A G (1982) The Stress of post disaster body handling and victim identification work. Journal of Human Stress, 8, 4-12.
- Taylor, V. (1977) Good news about disaster. Psychology Today, Reprint No. 434.
- Zurcher, L.A. (1968) Social-psychological functions of ephemeral roles : A disaster work crew. Human Organization, 27, 281-297.

Reprints :

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THE RESPONSES OF FIRE-FIGHTERS TO DISASTER AND THE POSSIBLE ROLE OF SOCIAL SUPPORT

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INTRODUCTION

The literature on the psychological consequences of disaster is not large, although there is a long history of concern with the possible effects upon victims of natural and man-made disasters. Part of the reason for the existence of a relatively small field of research has been the sheer unpredictability of many disasters, so that any investigation can only take place after the event, and the preparation for the assessment of any effects is characteristically hurried. There has also been a tendency for the psychological investigations to be relatively data-driven rather than theory-driven; the role of major psychological and social psychological theories in determining what will be measured, and how, has tended to be secondary to the desire to collect a wide range of data on many possible consequences, in the hope that some interesting relationships may be found between facets of the data.

The field of disaster research has been marked in recent years by a number of longer-term and theoretically guided studies. Among these, for example, is the study of the Buffalo Creek dam collapse (Gleser, Green & Winget, 1981), and many studies of the Three Mile Island (TMI) emergency (e.g. Collins, Baum & Singer, 1983; Task Group on Behavioural Effects, 1979). It is probably time to add that the bulk of the disaster literature has been concerned with the impact upon the victims of the disaster, e.g. Three Mile Island, although there are some studies of the effects upon work and professional groups (e.g. Chisholm *et al.*, 1981). Here again, however, the impact of attending a disaster upon emergency service personnel has begun to be recognized as important, from the point of view that the needs of such personnel for support are as important as those of the direct victims, but also because a recognition of such needs may alleviate any negative sequelae and help to maintain an effective response to disaster.

"The way you as emergency workers cope with these reactions is *more* important than the way the victims cope, because your natural reactions are crucial to your job performance, then or later, and your inability to function may become a disaster in itself." (Hendtlass, 1983;) (*italics added*).

Disaster as an Occupational Stressor

The need to help the victims of a disaster adjust to the acute and longer-term effects is, naturally, a factor of supreme importance in the determination of any research into disaster aftermath. Both the professional and volunteer personnel who are expected to attend a disaster can also be victims, albeit having more warning (perhaps) of the event and also having more training and experience to cope with its impact. In this sense attendance at the site of a major disaster, such as a cyclone, bushfire or earthquake, can be viewed as a specific occupational stressor, something which is part of the job and which must be faced, and to which there has to be some kind of adjustment, positive or negative.

The study of occupational stress has, in the main, examined the chronic levels of activity, both in the physical and social senses, which accompanies any job. The number of studies which have examined the impact of a critical job events (cf Eden, 1982), in which a particular, identifiable stressful job activity occurs, have been much less common. While no-one denies that the work of monitoring the controls of a nuclear power station can be stressful in a general day-to-day sense, the particularly rapid and dangerous events which occurred at TMI constitute a more salient, and differentiable job stress which may have particular effects upon professional personnel (cf. Chisholm et al., 1981). In like manner, service personnel will have experienced a general level of stress, fluctuating quite widely over time. But the reactions of such people to disasters involving multiple deaths are not necessarily predictable from their reactions to day-to-day events (cf. Jones & Fischer, 1982; Latane, Eckman & Joy, 1966). Professionals in any kind of emergency role are likely to meet and be forced to adjust to experiences quite outside the normal range (cf. the reactions of recovery personnel to the Air New Zealand DC10 Mt. Erebus crash; Taylor & Frazer, 1981).

Psychological research into the impact of disasters needs to include consideration of the effects of exposure to the aftermath of the disaster upon the emergency services personnel, and can set such research within the more general framework of the study of occupational stress. In this way general psychological theory may enable the design and analysis of studies to isolate and predict particular effects and therefore help lead to the development of procedures to minimise negative effects.

The range of psychological research which can be considered as relevant to the study of reactions to disaster is, of course, vast. The reactions to a perceived loss of control can be seen in the light of psychodynamic theories (e.g., Haan, 1977) or theories of learned helplessness (e.g. Glass & Singer, 1972). The response of the individual can be considered as stemming from

internalised patterns of behaviour and coping mechanisms or from shared conceptions of appropriate and normal behaviour, founded upon a social comparison of needs and abilities (e.g. Taylor, 1983). Or again, occupational stress can be viewed as contingent upon individual differences in the ability to cope with particular stressors or as the result of a more complex set of social roles than an individual must adopt and which may determine various strains due to incompatible responses being required in particular settings (e.g., French, Rodgers & Cobb, 1974).

Context of the Present Study

A study of some of the consequences of occupational stress for members of the South Australian M.F.S. has been in progress for three years. Specifically, the self-reports of physical and psychological effects of stress at work are being examined retrospectively and prospectively. The theoretical models guiding data collection include the Michigan environmental stress group (e.g. House et al., 1979; La Rocco & Jones, 1978) in which the role relationships and role conflicts that an individual may experience are regarded as strain variables which may elicit stress reactions, and in which particular forms of social support may act to buffer, or reduce, such strain. Other research having heuristic value is that which seeks to identify individual difference variables which may act to lower or exacerbate particular forms of job stress in interaction with identifiable job and life stress events (e.g. Kobasa et al., 1972). Preliminary reports of such work (e.g. Clarke & Innes, 1983; Innes & Clarke, 1983) point to the protective role of social support and the risk heightening effect of some personality variables (see also Innes, 1981).

Within the framework of the study of general, chronic stressors at work, we have been mindful of the role that critical job events may play. The exposure of fire-fighters to a major structure fire, with the possibility of contact with burn victims and the dead, was perceived as a stressor likely to have specific identifiable effects. To this end, a questionnaire was developed, based in part upon studies of the reaction of military personnel to the recovery of victims in the Jonestown massacre, as well as items previously used specifically with fire fighters (Jones & Fischer, 1982; Murrin & Williams, 1980). When the South Australian bushfires, of the 16th to 19th February, 1983 occurred, in which some shifts of S.A.M.F.S. men were employed close to the city of Adelaide, the questionnaire was administered to elicit information on the effects of a critical job event.

In view of the large body of research which indicates that the perceived support that can come from co-workers and from one's family may play a role in reducing the degree of strain experienced (cf. Clarke & Innes, 1983; La Rocco & Jones, 1978), a measure of such support was included.

There is a conceptual point which should be made at this point. There is no doubt that, in the wide perspective the "Ash Wednesday" bushfires were a national disaster, involving as it did widespread destruction of property, life and the disruption of normal social processes. From the perspective of the individual, however, we may need to regard the situation confronted by trained, emergency personnel, in this case the S.A.M.F.S., as an emergency, i.e. a major disruption at a more focalised geographical point, closer to the metropolitan area, with the stronger possibility of containment. This distinction is made by Kearney and Britton (1983), and it deserves to be made. Whether or not it is valuable empirically, however, at the level of the response of the individual, remains to be seen.

Methodological Note

As with many other investigations of the effects of disasters, this study uses a single post-event case study, a research design which does not have a good record for disentangling any threats to internal validity (Campbell & Stanley, 1966). We report data from immediately after the fire; there are no data as to possible delayed effects. There are no comparison data, from fire-fighters at structure fires, from members of the Country Fire Service (C.F.S.), or from victims of the fire. The study is one of a source of occupational stress with, however, a source of stress of such magnitude that effects can be considered to occur quite generally within the sample of fire-fighters.

The data collected were all self-reported reactions and the variables designated as predictor variables and those as reactions were assessed in the same questionnaire at the same time. There is therefore no likelihood of independence of measurement, and there is the possibility of defensiveness in reporting effects and in some response set affecting all reactions. The questionnaire, in this instance, was administered anonymously so a defensive or socially desirable response set may be minimised. The measures of both predictor and dependent variables were scattered throughout the questionnaire, a factor which may act to dissipate any response set to maintain consistency throughout the time of completion of the instrument.

Method

Over the course of the emergency four shifts of the M.F.S. were engaged in fighting fires close to the metropolitan area of Adelaide. The men were asked on their return to the station to complete questionnaires to elicit their physical and mental reactions to exposure to the fires, and to return them in pre-paid envelopes. Seventy-two responses from trained,

experienced fire-fighter personnel were analysed. In addition the responses of nineteen recruits, who had joined the force only a matter of weeks earlier, were obtained. The data from the latter sample are not reported here.

Four measures of physical and mental stress were obtained, as listed in Table 1. These were labelled as effects or endogenous variables.

Table 1. Self-Reported Stress

Physical Health at Time of Fire

Reported heat exhaustion, physical exhaustion, smoke and ash damage, nausea, excessive heart rate, headache and dizziness.

Physical Health After Fire

Reported loss of appetite, nausea, digestive upsets, headaches, pain in mouth, nose, respiratory tract.

Mental Effects During Fire

Reported feelings of fear, tension, depression, confusion, distraction, anger, hopelessness and bewilderment.

Mental Effects After Fire

Reported feelings of restlessness, depression, anger, difficulties in concentration, memory loss, recurrent thoughts of fire.

The Score for each stress category was the total number of items reported in each category.

The questionnaire items labelled as predictor variables are shown in Table 2. Two types of stressor were identified, those specifically concerned with physical exposure to the fire, and those, strain variables, concerned with the actual job of dealing with the fire. The degree of responsibility for others and for equipment, the conflict arising from responses to differing instructions, and the need to cope with members of the public who were behaving inappropriately to the situation were the strain variables considered.

Table 2. Self-Reported Stressors.

Physical Exposure

Fire Severity:	Rating from Extreme to Low.
Exposure Severity:	Rating exposure to smoke, flame and heat.
Exposure Duration:	Estimated time
Exposure Danger:	Rating

Strain Variables

Responsibility :	Provision of emotional support to other fire-fighters; perception of too much responsibility for other people and for apparatus.
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Strain Variables (continued)

Decision Stress:	Need to make decisions without referral to senior officer.
Conflict:	Perception of conflicting sets of instructions and need to make choice.
Image:	Consciousness of adequacy of performance in eyes of senior officer and in eyes of public.
Public:	Reaction to indications of panic in members of the public.
Rendering Support:	To Other Firefighters To Members of the Public

Measures of perceived social support, from spouse, and overall, were also obtained, on a four point rating scale.

Results and Discussion

Table 3 reports the inter-relationships between the predictor variables.

Table 3. Correlations Between Predictor Variables*

	1	2	3	4	5	6	7	8	9
1. Fire Severity	-	.32	-	.21	-	-	-	-	-
2. Exposure Severity		-	.33	.75	.42	.41	-	-	.40
3. Exposure Duration			-	.41	-	.30	-	-	.24
4. Exposure Danger				-	.52	.50	-	-.22	.48
5. Responsibility					-	.36	-	-	.33
6. Decision Stress						-	.21	-	.33
7. Role Conflict							-	-	-
8. Image								-	-
9. Public Stress									-

* Correlations within table are significant at 5% level.

It may be seen that reports of physical danger are inter-correlated and that reports of responsibility and decision stress are also associated. Role conflict and self-image are not, however, associated with the other predictor variables.

The magnitude of these correlations were considered not to preclude their use in a multiple regression analysis. Step-wise regression was used, with physical and work load variables as predictors, and the mental and physical reactions, reported after the fire, as effects.

These two analyses were each done twice. The sample was split into those who reported high degree of perceived emotional or moral support from their co-workers after the fire, as against those who reported relatively low levels, and the regression analysis was carried out on each sample separately.

Table 4. Step-Wise Multiple Regression Analysis:
Physical Effects Reported After Fire, for Low
and High Perceived Social Support Samples.

<u>Significant Predictor Variables</u>	<u>R²</u>	<u>R² change</u>	<u>Beta</u>
<u>Low Work Support</u>			
Danger	.201	.201	.306
Conflict	.294	.093	.449
Workload	.378	.083	-.814
Self-Image	.492	.114	.474
<u>High Work Support</u>			
Exposure Severity	.426	.426	.226

Table 5. Step-Wise Multiple Regression Analysis:
Psychological Effects Reported After Fire,
for Low and High Perceived Social Support Samples

<u>Significant Predictor Variables</u>	<u>R²</u>	<u>R² change</u>	<u>Beta</u>
<u>Low Work Support</u>			
Danger	.316	.316	.714
Aiding Firefighters	.479	.163	.316
Self-Image	.579	.100	.554
Conflict	.650	.070	.362
Fire Severity	.708	.058	-.016
<u>High Work Support</u>			
Danger	.326	.326	.274

The results for physical effects of the fire are reported in Table 4, and for mental effect in Table 5.

Examination of these data shows first, that fire-fighters who report relatively high degrees of emotional support from co-workers have relatively few factors which predict their degree of physical or psychological stress. In both cases only reported physical strains emerge as predictors of stress. For those fire-fighters who report relatively low degrees of emotional support, however, there is a wider array of variables which predict stress.

These data support a range of other results which suggests that emotional support, from diverse sources, can act directly or indirectly to reduce the impact of a stressor variable. Clarke and Innes (1983), for example, have shown the relationship between life event stressors and reported physical and psychological symptoms to be significantly lower for those reporting high degrees of social support. Other studies have reported similar findings, e.g. La Rocco and Jones (1978), although there are studies which do not find such effects, e.g. Gore (1978). For the present, the results of these regression analyses suggest that, when reporting the effects of a very specific and traumatic encounter, the perception of emotional support from co-workers can act to eliminate the influence of a range of likely causal factors. With perceived support psychological and social strain variables are not seen as being stress-inducing.

A second feature to draw from the data is that the wider array of variables perceived as influencing outcomes includes more psychological strain variables, conflict, perceived workload and self-image, as significant. So, for this sample of fire-fighters a degree of stress emerges, predicted by the psychological strain of organizing fire-fighting activity and the maintenance of self-image in the eyes of the general public and of senior officers.

Implications and Conclusions

The data reported are extremely limited, both with respect to the sample of men studied and the range of psychological stress variables measured. Clear limitations have to be set on the generalisations which can be made.

First, the data were collected on a sample of trained fire-fighting personnel. Their ability to cope with the stress of a fire is likely to be far greater than any other sample. Against this, however, is the fact that members of the M.F.S. are trained to work in teams in structure fires; the kind of rapidly changing fire-front likely to be encountered in a bush-fire may not fit so closely with the training received. It is

the fire-fighters may not have been optimal for the task faced.

Second, it is obvious that a very limited array of strain variables were included in the questionnaire. Further study should include more varied items. Given the desire to collect data as close to the event as possible, however, and as the men were contacted almost as soon as they came off duty, a shorter questionnaire, with a limited number of variables was seen as necessary.

The relationships between the strain variables and the stress effects, however, are in line with work into general job stress (e.g. Clarke, 1981; House, 1981). Therefore, while the variables are limited in scope, the relationships observed are congruent with previous research, a fact which validates the choice of material included in the instrument.

A major problem in the interpretation of these data upon the conceptual validity of the measure of social support. Is the perception of high versus low degrees of co-worker support a function of the general morale of the group of men on duty at a particular shift, or is it a function of the personality characteristics of the people making the judgment? There are no objective, external measures of group morale; we are entirely dependent upon the view from the individual, be he good-natured and popular or paranoid and isolated. The perception of low support may be a veridical one, and that lack of support may be causally implicated in the effects of stress. But we are unable to partial out the possible direct effect of a particular personality pattern upon a stress reaction, from the effect of that pattern upon social support, in turn affecting stress.

For the present we may accept that perceived social support may play some role in influencing the effects of exposure to stress, however they may be mediated. Identification of those mediating factors is an important goal, however, if we are to be able to put forward particular recommendations for the training or the counselling of emergency services personnel. The implications for "debriefing" procedures after an emergency, or for the training of coping devices, are very different if we have to aim to change the social forces within a group, as against changing the behaviour patterns of the individual within the group. The practical implications of this research are as yet somewhat limited until clearer conceptual analyses and empirical results are available which may enable a specification of the nature of the observed effects. To introduce changes into selection or training of fire fighters on the basis of such data would be premature.

References

- Campbell, D.T., & Stanley, J.C. (1966). Experimental and quasi-experimental designs in research. Chicago: Rand-McNally.
- Chisholm, R.F., Kasl, S.V., Dohrenwend, B.P., Dohrenwend, B.S., Warheit, G.J., Goldsteen, R.L., Goldsteen, K., & Martin, J.I. (1981). Behavioural and mental health effects of the Three Mile Island accident on nuclear workers: A preliminary report. Annals of New York Academy of Sciences, 365, 134-145.
- Clarke, A.J. (1981). Reported stress in a high stress occupation. Unpublished Honours thesis, University of Adelaide.
- Clarke, A., & Innes, J.M. (1983). Sensation-seeking motivation and social-support moderators of the life stress/illness relationship. Personality and Individual Differences, 4, 547-550.
- Collins, D.L., Baum, A., & Singer, J.E. (1983). Coping with chronic stress at Three Mile Island: Psychological and Biochemical evidence. Health Psychology, 3, 149-166.
- Eden, D. (1982). Critical job events, acute stress and strain: A multiple interrupted time series. Organizational Behaviour & Human Performance. 30, 312-329.
- French, J.R.P., Jr., Rodgers, W., & Cobb, S. (1974). Adjustment as person-environment fit. In G.V. Coelho, D.A. Hamburg & J.E. Adams, (Eds.) Coping adeptation, New York : Basic Books
- Glass, D.C. and Singer, J.E. (1972). Urban stress. New York: Academic Press.
- Gleser, G.C., Green B., & Winget, C. (1981). Prolonged psycho-social effects of disaster. New York: Academic Press.
- Gore, S. (1978). The effect of social support in moderating the health consequences of unemployment. Journal of Health and Social Behaviour, 19, 157-165.
- Haan, N. (1977). Coping and defending. New York: Academic Press.
- Hendtlass, J. (1983). The after-effects on emergency services personnel. Paper presented to Fifth Annual Combined Emergency Services Seminar, La Trobe University, Victoria.
- House, J.S. (1981). Work stress and social support. Reading, Mass.: Addison-Wesley.

- House, J.S., Wells, J.A., Lauderman, L.R., McMichael, A.J., & Kapland, B.H. (1979). Occupational stress and health among factory workers. Journal of Health and Social Behaviour, 20, 139-160.
- Innes, J.M. (1981). Social psychological approaches to the study of the induction and alleviation of stress. In G.M. Stephenson & J.H. Davis (Eds.), Progress in Applied Social Psychology, Vol. 1., New York: Wiley.
- Innes, J.M. & Clarke, A. (1983). Firefighters' health - The effects of stress. Fire International, (79), 37-38.
- Jones, D.R., & Fischer, J.R. (1982). Emotional effects on USAF personnel of recovering and identifying victims from Jonestown, Guyana. USAF School of Aerospace Medicine, Brooks Air Force Base, Texas.
- Kearney, G.E., & Britton, N.R. (1983). Behavioural response in disaster. Pacific Loss Adjusters Convention, Nadi, Fiji (October). (Available from Centre for Disaster Studies, James Cook University of North Queensland)
- Kobasa, S.C., Maddi, S.R., & Kahn, S. (1982). Hardiness and health: A prospective study. Journal of Personality and Social Psychology, 42, 168-177.
- La Rocco, J.M. & Jones, A.P. (1978). Co-workers and leader support as moderators of stress-strain relationships in work situations. Journal of Applied Psychology, 63, 629-634.
- Latane, B., Eckman, J., & Joy, V. (1966). Shared stress and inter-personal attraction. Journal of Experimental Social Psychology, 1966, 1 (Suppl. 1), 80-94.
- Murrin, E.C., & Williams, G.R. (1980). A study of the responses of fire-fighters to fire fatalities. Journal of Fire and Flammability, 11, 45-62.
- Task Group on Behavioural Effects. (1979). Report to the President's Commission on the Accident at Three Mile Island. U.S. Government Printing Office: Washington, D.C.
- Taylor, A.J.W., & Frazer, A.G. (1981). Psychological sequelae of Operation Overdue following the DC10 Aircrash in Antarctica. Publications in Psychology, Victoria University of Wellington, New Zealand.
- Taylor, S.E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. American Psychologist, 38, 1161-1173.

POST TRAUMATIC STRESS DISORDER IN FIREFIGHTERS : ASH WEDNESDAY

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INTRODUCTION

Following the Ash Wednesday bushfires, the Country Fire Service fire fighters were a group who evoked particular community concern. Their exposure was often extreme with three volunteers having lost their lives on February 16th. Researchers have recently been focussing on the issue that the division between victim and helper in disasters is possibly erroneous. (Raphael et al 1983, Taylor and Fraser 1981). In many instances the disaster relief workers are also members of the local or neighbourhood communities that have been prey to the calamity. There is little advocacy for these individuals because they are often members of volunteer organisations so that little attempt is made to document their needs arising from the longer term effects of their experience.

There is considerable variation in the research reports of natural disasters about the prevalence of psychiatric disorder. Typical of one end of the spectrum is the work of Penick et al who state that although approximately three quarters of the victims of a tornado suffered from increased psychological discomfort of a subjective nature five months after the event, such disasters do not produce severe emotional impairment and few of the victims felt the need for professional mental health assistance. Such reports would certainly be supported by the life events literature where the general conclusion has been reached that life events stress accounts for no greater than 10% of the variance of causality of psychiatric disorder in a population at any one time (Andrews and Tennant). On the other hand Leopold and Dillon reported high levels of serious disorder amongst the survivors of a marine explosion on the Delaware River in 1963. All the victims of this accident had received realistic compensation and none had received interim psychiatric treatment. The immediate effects in the majority of cases were appropriate to the circumstances, but longer

term investigation indicated appreciable deterioration in 71%, most frequent and most marked in the age group of 36 and over. They concluded that the pattern of symptoms was strikingly similar amongst all those adversely affected. Their conclusion that prolonged and severe psychiatric morbidity arises amongst the disaster victims is certainly not an isolated example.

Thus there seems to be little resolution about the question whether people simply experience non specific stress related symptoms or major post traumatic stress disorders following natural disasters. Part of the ambiguity arising from the research literature depends upon the clinical bias and methodologies used to study the psychological effects of disaster. Many of those studies that have used standardised methodologies have been based on symptom scales and have not applied specific diagnostic criteria to describe the nature of the difficulties in those exposed. Parker's use of the General Health Questionnaire to study evacuees from Darwin was an important step forward because it utilised a standardised methodology that allowed the definition of psychiatric caseness. However instruments such as the GHQ do not make any attempt to define the nature of the disorder experienced by the individual so that it is difficult to translate the score on such an instrument into clinical details. A number of the anecdotal studies that have described the development of post traumatic disorders in disaster victims, such as that of Leopold and Dillon, have not used a validated diagnostic criteria or a strict phenomenological approach in their research. The firefighters following the Ash Wednesday fires, provided an opportunity, using a prospective research design, to examine the onset of post traumatic stress disorders. This is a relevant question to investigate, because there is a considerable body of evidence to suggest that these conditions do not resolve with time and require specific treatment (Archibald et al). Many issues about post traumatic stress disorders are also unresolved because most of the studies conducted have either been in soldiers or victims of man-made accidents where compensation and head injuries are important confounding variables. The work of people such as Adler has suggested that such factors can significantly alter the phenomenology of post traumatic syndromes.

AIMS

The general aims of the research project looking at the Country Fire Service firefighters was firstly to describe the prevalence of psychiatric disorder amongst this group. Secondly, it aimed to describe the relationship between psychiatric disorder and the extent of exposure on Ash Wednesday, the nature of individual personal and property losses, the presence and severity of injury as well as previous disaster experience. The third aim was to investigate the prevalence of post traumatic stress disorders amongst the firefighters and to describe the antecedents.

METHODOLOGY

A three stage research design was used. An original sample of 489 firefighters was surveyed by questionnaire four months after the fires. These questionnaires were distributed through the Country Fire Service and as a result the representativeness of the sample could not be established. The Country Fire Service at that stage, did not have an adequate membership list to allow direct contact with firefighters. Based on a preliminary analysis of the data from this sample a sub-group of 50 individuals were interviewed. They were defined to have a risk of developing post traumatic stress disorders on the basis of the information previously collected. They were interviewed eight months after the disaster and the interview was specifically designed according to the DSM III criteria for post traumatic stress disorders.

A preliminary analysis of the interview data was then carried out to design a questionnaire for the third stage of the study. This entailed recircularising the original 489 firefighters with a supplementary questionnaire. This stage of the project was conducted eleven months after Ash Wednesday and a simultaneous control study was set up. Three hundred members of four brigades were contacted through the CFS. They have been followed up with three reminder letters to attempt to achieve a high return rate. In this way it will be possible to compare the levels of morbidity amongst the first group as against the general CFS membership.

In the first stage of the study five general areas were investigated. The dependent variables were the Impact of Events Scale (Horowitz) and the 12 item GHQ (Goldberg). The extent of adversity experienced as a result of the fire was enquired about. This included both losses and the intensity of the exposure of the firefighter on Ash Wednesday. Intercurrent life events were also measured. The perceived threat experienced on Ash Wednesday was also ascertained as was the firefighters previous disaster experience.

Today I am going to focus on the second stage data. This consisted of an interview that took from 1 1/2 hours to 4 hours to conduct. It was primarily based on the DSM III diagnostic criteria for post traumatic stress disorders. The 12 item GHQ and Eysenck Personality Inventory was simultaneously administered. Other general areas covered during the interview included the firefighters physical health since the fire, the behaviour of the firefighters group on Ash Wednesday, specific questions about the firefighters thoughts and feelings about the event and their recollections about the perceived threat experienced during the fire. The firefighter was also asked about life events that had occurred and other interpersonal problems. An enquiry was then made about the individual's utilisation of health services and about steps they had taken in an attempt to control their intrusive thoughts and feelings about the fire. Finally, the individual's interpersonal functioning, particularly

focusing on their relationships within their family was explored. Mr. Gary Croft and Dr. Mary Frost conducted these interviews in the firefighters' homes. The level of distress experienced by a number of the men, made these interviews a stressful experience for all concerned in the research. At times it made it difficult to carry out the structured interview in the way in which it had been designed and as a result there was perhaps more missing data than would be customary in other research situations.

In the third stage of the study, the following areas were covered; more detailed demography about the firefighters was collected, the continuing effects of property and personal losses were investigated, the use of health services and contact with the Country Fire Service following the fires was documented, the Impact of Events Scale and the GHQ were readministered as well as a symptom measure and a measure of interpersonal functioning developed from the interview. A preliminary attempt to validate the questionnaire from the interview data could only be achieved on nine cases but a correlation of .8 was obtained.

Selection of Subjects for interview

Before deciding who should be interviewed it was necessary to ask the question whether on the basis of the data collected, the exposure and losses of the firefighters was sufficient to predict that some would develop post traumatic stress disorders. The stage 1 group had a mean age of 33 ranging from 16 to 67. Their social background was fairly evenly distributed across the social groups. The level of personal property loss was substantial. 9% had had their livelihood affected in some way and 22% had had some form of property loss. 23% had either had a relative or friend die or be injured in the fire. Looking at their exposure, the mean duration of the time they spent fighting the fire was 14.8 hours and this was followed by an average of 3.5 days mopping up. Most returned to work with no rest after their ordeal. 30.6% were trapped by the fire and 26.6% were injured. Of these 3.2% required treatment in hospital. 20% believed they came close to dying and 41.2% had need to use emergency procedures on at least one occasion to protect themselves. The mean number of major fires fought in the past was 10. Thus on most measures the level of exposure experienced by these firefighters was extreme.

In selecting the group who were at risk of having post traumatic stress disorder the following hypotheses were developed. Firstly, post traumatic disorders would be common amongst those who had a high impact of events score four months after the disaster because intrusive thoughts and feelings were a component of post traumatic stress disorders. Secondly, this syndrome had been more common in those who had had a high exposure to the disaster being measured by the duration, the intensity of the threat and whether or not they were injured during the fire.

It was also hypothesised that those who had developed post traumatic stress disorders would be scoring in the range typical of a psychiatric case at four months. It was also suggested that these people would have had a higher level of personal and property loss in the disaster as well as a greater number of life events prior to and following the event.

Concerning predisposing factors, it was hypothesised that those who had developed post traumatic stress disorders would have a high score on the neuroticism scale of the Eysenck Personality Inventory but there would be no difference on the Extroversion Scale. This was based on the findings of the NH & MRC Social Psychiatry Unit Study in Canberra (Henderson et al).

It was also hypothesised that those who experienced extremely emotional arousal during the disaster as measured by panic would be more likely to develop the condition and that it would also be more common amongst those who were older and had had less experience of major disasters.

Aims of interview

As already described, the aim of the interview was to attempt to diagnose or exclude post traumatic stress disorders according to DSM III using a structured format. These findings were then to be used for the design of the eleven month questionnaire. It is also aimed to interview a sufficient sample to allow statistical analysis within the interview group to allow definition of the variable associated with post traumatic stress disorders. Finally, it was hoped to compare on the basis of the eleven month data the outcome of the 50 firefighters who had been interviewed with a matched sample who had not been interviewed. This will provide some evidence as to whether a symptom based assessment of firefighters has any therapeutic role. In this presentation only aims 1 and 3 will be addressed. To meet the objectives subjects from the following groups were interviewed.

1. A group of firefighters who scored high on both the GHQ and Impact of Events Scale. These would be divided into those who had a high and low exposure. This was based on the assumption that people who had intrusive thoughts and scored as psychiatric cases four months after a disaster were likely to have a post traumatic syndrome.

2. There is much evidence to suggest that post traumatic syndromes have a delayed onset. For this reason it was decided that it would be necessary to interview a group of people who were not defined as psychiatric cases on the GHQ at four months but could be hypothesised to be at risk. These were people who had had high exposure and scored high in the Impact of Events Scale or those who had had a low exposure and had a high score of the Impact of Events Scale.
3. It was also necessary to ensure that individuals who had had a high exposure to the fire would not subsequently go on to develop post traumatic syndromes in the absence of intrusive thoughts or reported psychiatric symptoms at four months. For this reason a group of people who had only a high exposure were interviewed.
4. Post traumatic syndromes according to the DSM III criteria can occur amongst those who do not report intrusive thoughts and feelings but simply have a recurrence of strong affects when are confronted with specific triggers. For this reason, a group of people who had a high exposure and were scoring in the case range of the GHQ but had a low impact of events score were interviewed.
5. Finally, a group of people who were scoring in the case range of the GHQ but did not have a high exposure or high impact of events score were interviewed to ensure that they did not represent a group of people who had post traumatic syndromes following a low exposure. It was hypothesised that this group were likely to represent those with pre-existing or concurrent psychiatric disorders in this population.

RESULTS

Examination of the data reveals that 10 firefighters with post traumatic stress disorders were isolated. One of these will be excluded from the data analysis because this man's symptoms appear to have substantially resolved at the time of interview. All of those who had developed the syndrome occurred amongst firefighters who had reported a high impact of events scale at four months. Those with post traumatic syndromes came from only three of the groups interviewed. Firstly, four out of seven of the group who had a high impact of events scale at four months and were scoring in the pathological range of the GHQ had post traumatic stress disorders. Three out of three of those who had a low exposure but reported report a high

impact of events scale and were scoring in the caseness range of the GHQ were identified as having post traumatic stress disorders. None of those who scored in the caseness range of the GHQ at four months but were not in the top 25% of scorers on the impact of events scale was diagnosed to have a post traumatic stress disorder. This indicates that intrusive thoughts may be a necessary but not sufficient predictor of a post traumatic stress disorder. Two out of the seven fire-fighters who had high impact of events score, a low exposure and were not defined as psychiatric cases on the GHQ at four months were found to have subsequently developed post traumatic stress disorders. None of those who had a high exposure and intrusive thoughts at four months were found to have post traumatic stress disorders. This suggests that above a certain level of exposure intrusive thoughts do not have the same predictive value of psychiatric morbidity. Although the data has not been adequately analysed it is possible to speculate on the basis of the evidence. Firstly, the family history of a post traumatic stress disorder was identified in three of the nine cases. This raises the possibility that a constitutional vulnerability for this condition may exist. It also seemed that there was a relatively low threshold of exposure for the development of post traumatic stress disorders, this explaining why members of the low exposure groups who had high levels of intrusive thoughts went on to develop post traumatic stress disorders. It is possible that the presence of intrusive thoughts in a low exposure group have a much greater predictive value in the presence of intrusive thoughts and feelings in a group who had a high exposure to the event. This was suggested by the finding that none of the individuals who had a high exposure in intrusive thoughts were found to have a post traumatic stress disorder.

The finding that all of those who had post traumatic stress disorders in a high exposure group were scoring abnormally on the GHQ at four months suggested that once over the threshold of exposure for development of a post traumatic stress disorder, an increased level of exposure tends to lead to the more rapid development of this condition. In other words, all of those in a high exposure group who are likely to get the disorder will have developed it by four months explaining why none of the high exposure, high impact of events scale group who were scoring normally on the GHQ were found to have this condition. The finding that some of the people in the low exposure, high impact of events scale group who were scoring normally on the GHQ were found to have this condition. The finding that some of the people in the low exposure, high impact of events scale group who were not scoring abnormally on the GHQ at four months went on to develop post traumatic stress disorders, suggest this may be the group where there is a latency period for the onset of the disorder. Finally, it seems that a raised GHQ score in the absence of a

raised impact of events scale does not suggest a post traumatic syndrome. This would be in keeping with the diagnostic criteria that intrusive thoughts and feelings are an essential part of this syndrome. Some people who were high scorers on the GHQ at interview, seemed to have long standing anxiety disorders, and in fact reported a decrease in their symptomatology at the time of the disaster.

A between group comparison was carried out between the post traumatic stress disorder group in the other firefighters, attempting to see whether the physical or experiential characteristics would differentiate these two groups. The only factor that approached statistical significance was age, older men being more at risk of their developing a post traumatic syndrome. Thus higher levels of danger or loss were not reported in the post traumatic stress disorder group. This provides some support for the concept of there being a threshold level for the onset of the disorder.

Examining the psychometric data at four months and at the interview between those who had post traumatic stress disorders and those who did not the following results were found. On both occasions the GHQ of the disordered group was statistically greater. The Impact of Events Scale was statistically different between those who had the disorder at four months and those who did not although this had become significant at eight months. This suggests that intrusive thoughts alone are not a strong predictor of post traumatic stress disorders. The number of somatic symptoms such as headaches and a general feeling of unwellness were more common amongst the post traumatic stress disorder group. They also scored higher on the neuroticism scale and lower on the extroversion scale of the EPI. As was found in Henderson's study in Canberra, neuroticism seems to be an important predisposing variable. Interestingly, neither sleep disturbance nor any of the specific items of the Impact of Events Scale differentiated the subjects during the interview. The level of panic experienced by the firefighters in the post traumatic stress disorder group during the fire was no different from their colleagues.

In the interview the perception by the firefighter about the meaning of their symptoms and the utilisation of health care was examined. The question that critically differentiated those with post traumatic stress disorders and those who did not was "Are your thoughts and feelings interfering with your life?" All of those who had the syndrome at the time of the interview answered yes to this question. Interestingly, some of them did not think that there was anything wrong with them and denied that their feelings were a worry to them. When asked about whether they had consulted their doctor about these thoughts and feelings six out of ten had done so for

stress related symptoms and two had done so because of physical ill health. Only one of these men had been appropriately diagnosed and referred to a psychiatrist. Only two firefighters out of the other 40 had consulted their doctor at any stage after the fire for stress related symptoms. This would suggest that general practitioners are generally poor diagnosticians of post traumatic stress disorders as are the specialists who these men consulted. Looking at the health of the group who did not have post traumatic stress disorders, 37% of this group felt that they were in worse physical health and 63% of the total group had consulted their doctor in the previous eight months. Thus even those people who did not have post traumatic syndromes, a number had experienced a deterioration in their health since the disaster. Finally, looking at the way the firefighters had attempted to deal with their post traumatic symptoms, a change in alcohol consumption was an important predictor of the post traumatic stress disorder group. Three out of the ten had reported an increase in their alcohol consumption compared with one out of forty from the group who did not have this condition.

CONCLUSION

On the basis of this study the following conclusions can be reached :

1. Post traumatic stress disorders do occur in disaster workers and the associated symptoms are experienced as interfering by those who have the condition.
2. The level of detection and treatment is low, despite the frequent consultation of these firefighters with their local GP's. Similarly, some of these men had contacted the Bushfire Relief Unit and none had been referred for psychiatric assessment.
3. The level of exposure required to precipitate the disorder in a major disaster is not extreme, suggesting a threshold level. Exposure above this level seems to hasten the onset of the condition rather than increasing its prevalence.
4. The premorbid characteristics of the individual rather than the disaster experience seemed to be the strongest predictors of vulnerability. This perhaps has important ramifications for the selection of individual at risk after exposure to disasters and may effect recruiting policy.
5. Disaster organisations and health services should develop priorities and programmes to facilitate the early detection and treatment of those who developed post traumatic stress disorders in view of their long term prognosis. This deserves early consideration because many disaster workers are volunteers whose welfare is not protected by an employee group.

REFERENCES (in order of citation)

1. Raphael B, Singh B, Bradbury L, and Lambert F. (1984-84) Who Helps the Helpers? The Effect of a Disaster on Rescue Workers. *Omega* 14, 9 - 20
2. Taylor A J and Frazer A G (1981).

Psychological Sequelae of Operation Overdue following the DC10 Aircraft Crash in Antarctica, Publications in Psychology, Victoria University of Wellington, New Zealand.
3. Kinston W and Rosser R (1974)
Disaster: Effects on Mental and Physical State. *Journal of Psychosomatic Research* 18 : 437 - 456
4. Penick E C, Powell B J and Seck W A (1976). Mental Health Problems and Natural Disasters: Tornado Victims. *Journal of Community Psychology* 4, 64-67
5. Andrews G and Tennant C (1978). Life Events Stress and Psychiatric Illness. *Psychological Medicine* 8, 545-549
6. Leopold R L and Dillon H (1963) Psycho-anatomy of a Disaster: A Long Term Study of Post-Traumatic Neuroses in Survivors of a Marine Explosion. *American Journal of Psychiatry* 119, 913-921.
7. Parker G (1977). Cyclone Tracy and Darwin Evacuees: On the Restoration of the Species. *British Journal of Psychiatry*, 130 548-555.
8. Archibald H C, Long D M, Miller C and Teddenham R D (1962).

Gross Stress Reactions in Combat - A 15 year Follow-up. *American Journal of Psychiatry* 119, 317-322.
9. Adler A. (1945) Two Different Types of Post-Traumatic Neuroses. *American Journal of Psychiatry*, 102 237-240.
10. Horowitz M. (1979) Impact of Events Scale: A Measure of Subjective Stress. *Psychosomatic Medicine*, 41, 209-218
11. Goldberg D P (1972). The Detection of Psychiatric Illness by Questionnaire. Lond, Oxford University Press.
12. American Psychiatric Association, Diagnostic and Statistical Manual Third Edition, Washington.

13. Henderson S, Byrne D G and Duncan-Jones P (1981) Neurosis and the Social Environment. Academic Press Sydney.
14. Van Putten T and Emery W H (1973). Traumatic Neuroses in Vietnam Returnees. A Forgotten Diagnosis. Archives of General Psychiatry 29, 695-698.

THE EPIDEMIOLOGY OF DISASTER

by

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ABSTRACT

Epidemiology is the study of mass phenomena of disease or trauma. It is thus wholly applicable to disasters, and its principles may usefully be applied to their management and prevention.

Disasters, like diseases or trauma, result from the interaction of multiple causes. The causes are associated with three factors: the host (ie the victim), the agent (physical, biological, or chemical), and the environment, which may intensify or diminish the impact of the agent upon a susceptible host. Human behaviour profoundly influences all three factors.

The fruitful application of epidemiological principles is illustrated by some case studies in environmental medicine. They include the successful control, in peace and war, of disastrous epidemics of cold injury and heat illness, and the evaluation of the occupational stresses and hazards of bushfire-control crews.

PUBLIC VIEWS ON DISASTER RESPONSE AND THE NEWS MEDIA -
SOME AUSTRALIAN EXAMPLES

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INTRODUCTION

The news media play a number of vital roles in disseminating information about natural hazards in warnings of impending hazard impacts, descriptions of the death and destruction caused by disasters, charting the course of relief and recovery, and assisting in public education to ameliorate the effects by reporting disaster preparedness and hazard mitigation techniques (Rogers, 1980; Kreimer, 1980). The role of the news media in relation to natural hazards also varies with the type of hazard and with the various stages from warning through impact to rehabilitation. However, the present concern is with only one relatively narrow facet - news reporting in Australia of natural disasters as viewed by the public. While four aspects are considered, (myths about disasters, reporting of overseas natural disasters, public recognition of local emergency services, and control of the media during disasters) the principal investigation concerns myths about disasters.

In 1975 Dennis Wenger and associates at the University of Delaware published a paper in Mass Emergencies under the title "It's a matter of myths: an empirical examination of individual insight into disaster response". They conducted telephone interviews with 354 respondents in New Castle County, Delaware, an area with very limited disaster experience - that is, they interviewed non-victim respondents in a non-disaster setting. The central aim of the investigation was to examine whether the public exhibited "the lack of insight and acceptance of myths about disaster response that has been attributed to it by numerous investigators", notably E L Quarantelli and R R Dynes (1972). In brief, the majority of the individuals in the sample believed that controlling panic flight and looting in the aftermath are major problems facing disaster officials, that most people evacuate willingly, that the crime rate rises after the impact and that disaster victims are in a state of shock and unable to help themselves. The majority of the sample also believed that the news media accurately portrayed the amount of devastation resulting from a natural disaster.

This report presents the results of a very similar survey conducted in 1982 in Sydney and draws comparisons with the Delaware results. The results in some related surveys undertaken in Sydney are also presented and discussed. Some implications for the media and for disaster management are drawn from these findings.

The Sydney survey which paralleled the Delaware study was undertaken by students enrolled at Macquarie University in the General Education Course Natural Hazards. Interviews were conducted on a door-to-door basis at various times (day, evening, weekend) during the first two weeks of October. All 334 respondents lived in the Epping area (17km NW of Sydney GPO) and can be described as mainly working-age adults with middle to upper level incomes. Table 1 indicates the numbers of each sex interviewed in both the Australian and US studies. For the Epping sample 18-20% were estimated to lie in each of the 16-25, 26-35, 36-45 and 46-55 age groups, 15% in the 55-65 age group and 10% in the over 65 age group. The ages of the American respondents are not known.

Table 1. Sex of the respondents (%)

Sex	Epping (n = 334)	Delaware (n = 354)
Male	44.6	32.2
Female	54.5	66.9
Not known/both!	0.9	0.9

Table 2 indicates the proportion of each sample purporting to have had some personal disaster experience and the nature of that experience.

Respondents were asked "Have you ever experienced a natural disaster?" and (if the answer was "Yes"), "What type of disaster was it?" For the Epping sample "other" mainly included severe windstorms, hailstorms, and/or drought. In the American sample Wenger et al. (1975, p.40) note a number of "unique, idiosyncratic types of stress situation" such as "war", "house fire", "nervous breakdown", "six children" etc. Forewarned, such answers were discouraged in the Epping survey.

The responses to the third question asked "From what sources have you obtained the greatest amount of information about natural disasters?" are recorded in Table 3. The order of possible responses is presented as used in the Delaware survey. The order in the Epping survey was different and limited the number of responses to three. The Delaware survey evidently had no such restriction. The slightly different formulations in the two surveys make direct comparison difficult but both surveys indicate the overwhelming importance of news media as the predominant sources of information on natural disasters. It is also interesting to note that in each case only about 1 in 3 of those admitting disaster experience in Table 2 rate that experience as a salient source of information.

Table 2. Extent and nature of personal disaster experience

	Epping %	Delaware %
<u>Experienced Disaster?</u>		
Yes	28.7%	21.2%
No	70.7%	78.8%
No response	0.6%	-
<u>Nature of Disaster</u>	n = 119	n = 75
Bushfire	36.1	-
Cyclone/hurricane	10.1	41.3
Tornado	1.7	5.3
Flood	30.3	26.7
Earthquake	4.2	2.7
Other	16.8	16.0
Unknown	0.8	8.0
	100.0	100.0

Table 3 Sources of information about natural disasters

Sources	Epping %	Delaware %
Electronic media	129.6*	74.4
Newspapers	82.1	63.9
Magazines	13.2	15.3
Movies	10.5	0.6
Fiction books	3.6	0.6
Non-fiction books	7.2	3.9
Discussion with others	8.7	9.2
Direct experience	10.5	6.2
Other	1.8	5.6
	267.2	179.7

* For the Epping survey responses were TV, 86.8%; radio, 42.8%

RESULTS

The crux of the investigation lay in ten questions (Tables 4 and 5). For the first seven questions responses were in the form - agree, disagree, undecided or no response. The correct responses, based on extensive sociological investigation in the US (see, for example, Quarantelli and Dynes, 1972; Wenger *et al.*, 1975; 1980) are asterisked. Responses to the remaining three questions, of the sentence-completion type, are shown in Table 5. Correct responses are again asterisked. Where questions have been modified from the original American survey, the earlier version is given in a footnote to the appropriate table. Alterations were made only to present the Australian situation or to clarify the language.

The slightly different forms of some questions, the different interview and sample selection techniques, and the large number of interviewers used in each survey, make precise comparisons of the results difficult. Nonetheless, some general features are noteworthy. For most of the questions presented in Table 4 the majority of the interviewees believe the myth rather than the reality. In each case, however, a slightly smaller proportion of the Epping sample gave the erroneous view and a higher proportion were undecided or gave no response. Whether these results indicate the Epping sample is less gullible or better informed is a moot point. Certainly, a majority of the Epping sample have doubts about media accuracy in portraying devastation (Question 7).

The only major difference in results between the two surveys occurs in Question 3. Martial law has often been declared during civil disturbances in the US, whereas to the best of my knowledge, martial law has never been declared after an Australian natural disaster impact. On the other hand, many emergency personnel leaders hold military ranks, perhaps aiding the notion that military control has been declared, particularly in the case of Cyclone Tracy (Darwin, 1974).

The responses summarized in Table 5 suggest that the Epping sample believes that most evacuees utilize formal public shelters and that it is better to send money to disaster relief organisations than supplies or money directly to the stricken community.

DISCUSSION

Despite the differences between sample conditions, the Delaware and Epping surveys indicate considerable agreement in beliefs about human response to disaster. Moreover, Wenger *et al.* (1980) indicate from subsequent surveys, even where natural hazard impacts have recently occurred in three disaster-prone communities most residents believe the disaster myths. Although most of these beliefs are evidently erroneous they are widely held by non-victims in several areas.

Table 4

		Agree	Undecided/ no response	Disagree
		%	%	%
1. A major problem officials face in natural disasters is controlling the panic of people fleeing the danger area	Epping	77.2	7.8	15.0*
	Delaware	83.6	6.2	10.2
2. Looting rarely occurs after the impact of natural disasters.	Epping	23.7*	15.6	60.8
	Delaware	27.7	7.6	64.7
3. Military control/martial law has never been declared in an Australian disaster	Epping	44.6*	32.9	22.5
	Delaware	17.2	22.6	60.2
4. The crime rate usually increases in a community after a natural disaster has struck	Epping	45.2	27.5	27.2*
	Delaware	50.8	14.4	34.7
5. When warned of an approaching disaster most people are willing to cooperate and evacuate the area	Epping	76.9	6.0	17.1*
	Delaware	80.2	6.2	13.6
6. Immediately following the impact of a disaster, most of the disaster victims are in a state of shock and unable to cope with the situation by themselves	Epping	61.4	12.0	29.6*
	Delaware	73.7	7.0	19.2
7. The news media (TV, radio, newspapers), accurately portray the amount of devastation resulting from a natural disaster	Epping	41.3	12.0	46.7
	Delaware	54.5	9.9	35.6

American versions of the above questions. Differences are italicised.

1. A major problem *community* officials *confront when faced with a natural disaster* is controlling the panic of people fleeing from the danger area.
2. identical
3. *Martial law* has never been *instituted* in a disaster area in the United States.
4. The crime rate *of a community* usually *rises after it has experienced a natural disaster*.
5. When warned of an *impending* disaster, *people* are willing to cooperate and evacuate the area.
6. Immediately following the impact of a disaster, *the disaster victims* are in a state of shock and unable to cope with the situations by themselves.
7. The *news media* accurately portray the amount of devastation resulting from a natural disaster.

Table 5

	Epping %	Delaware %
8. The majority of the people who evacuate an area during a disaster go to:		
(a) formal public shelters such as schools and church halls;	50.9	42.4
or (b)*the homes of friends, relatives or neighbours, or provide for their own shelter	31.4	48.9
(c) undecided/no response	17.7	9.0
	<u>100.0</u>	<u>100.3</u>
9. Complete the following statement: The first place disaster victims turn for help is:		
(a) disaster relief agencies such as Red Cross, Salvation Army and emergency service organisations;	51.2	47.5
or (b) local groups such as churches, welfare agencies and service organisations;	10.5	15.0
or (c)*family and friends	32.3	32.5
(d) undecided/no response	6.0	5.0
	<u>100.0</u>	<u>100.0</u>
10. Complete the following statement: The most effective assistance I can offer to the victims of natural disasters is (answer one only):		
(a) Send supplies or money to the stricken community;	28.4	35.9
(b) Go in person to the community to help;	15.0	17.5
(c)*Send money to disaster relief organisations	48.5	38.1
(d) Do nothing	2.7	3.4
(e) undecided/no response	5.4	5.1
	<u>100.0</u>	<u>100.0</u>

American versions of the above questions. Only difference are presented;

- 8 (a) formally established public shelters.
 9 (b) special disaster relief agencies such as Red Cross, Salvation Army and Civil Defense.
 10. What is the most effective assistance you as a concerned citizen can offer to the victims of natural disasters? Would you (a)....

However, the sociological work on which these beliefs are established as erroneous is of American origin (see, for example, Quarantelli and Dynes, 1972; Wenger et al., 1975). The research necessary to establish true behaviour in the Australian situation has not, to my knowledge, been undertaken. However, we can be reasonably confident that as few people panic, as little looting occurs, etc. in the Australian disaster situation as in the United States (see also, UNDRO, 1979, p15-16, 111-112). Certainly, Short (1979, p453) notes only 6.6% of the Brisbane flood (1974) sample were directed to accommodation by emergency personnel. Wettenhall (1975, p83), reporting on the Hobart bush fires of 1967, found "little evidence of panic" and noted with regard to looting "The truth is somewhat obscure: many relief workers, particularly in country towns, are convinced that some looting did take place, yet the police found insufficient evidence to bring any charges." On the other hand the Chamberlain et al. 1981) survey The experience of Cyclone Tracy indicates that 78% of the sample believed "there was much looting, the greatest proportion of reports coming from non-returned evacuees". It is important to note that neither the Darwin nor the Hobart examples confirm or deny the actual incidence of looting. Scanlon (1979, p139), Foster (1976, p230) and Britton (1983, p185, 189) provide evidence of media-spread rumours in the aftermath of Cyclone Tracy and the Tasmanian bushfires (1982) while Wettenhall (1975, p221) reports that following the Hobart (1967) bushfires the media "in toto.... did not seriously exaggerate the effects of the disaster".

It seems reasonably certain from the results presented by Wenger et al. (1975; 1980) and from the survey reported here that myths about behaviour during and after disasters are widespread in both American and Australian communities. It also seems clear from Table 3 that the news media are by far the most frequently-cited source of individual information about natural disasters. However, as Sood (1982, p103) points out, the media need not necessarily have the greatest impact upon audience knowledge of disaster.

Some related aspects of the media role in disaster reporting were considered in other surveys by Macquarie University students. For example, the importance of the media in providing information was also addressed in a 1983 survey by Macquarie University students which examined some aspects of Australian overseas disaster assistance. Two surveys were conducted in October 1983. In West Lindfield (11 km north of Sydney GPO) 340 people were interviewed and in Auburn (16 km west of Sydney GPO) 156 respondents were questioned. The West Lindfield area can be described as older working-age couples with upper level incomes. The Auburn area is dominated by relatively recent migrants to Australia, particularly from the shores of the Mediterranean and southeast Asia. Table 6 summarizes responses to the question "From what source/s did you learn of overseas natural disasters during the last four

weeks?". In West Lindfield 437 responses were recorded, in Auburn 104. The pre-eminence of TV as a disaster news source is again evident (cf. Table 3). Another question asked "If you heard/saw/read conflicting stories about a natural disaster on radio/TV/newspapers which would you be most inclined to believe? Respondents were asked to rank their choices.

The first ranks for the two surveys are presented in Table 7. TV is clearly the most believable source of information about natural disasters. These results are similar to those obtained in United States which indicate that television is the most widely used and credible source of news (Larson, 1980, p 197). However, some Australian respondents exhibited a healthy skepticism - Table 8 summarizes responses to the question "What word (of the five listed) best describes media reporting of overseas natural disasters?". Although nearly half of each sample appeared happy with the accuracy of overseas disaster reporting, more than one quarter were dissatisfied with the quality and up to one quarter with the quantity of disaster information.

Table 6 Responses to question - "From what source/s did you learn of overseas natural disasters during the last four weeks?".

	W. Lindfield %	Auburn %
Newspapers	27.7	20.2
Magazines	3.6	1.9
TV	37.5	54.8
Radio	27.0	19.2
Other	4.1	3.8
	99.9	99.9

Table 7 First rank response to question: "If you heard/saw/read conflicting stories about a natural disaster on radio/TV/newspapers which would you be most inclined to believe?".

	W. Lindfield %	Auburn %
Radio	21.7	25.7
TV	46.9	62.5
Newspaper	31.5	11.8
	100.1	100.0

Table 8 Responses to the question: "What word best describes media reporting of overseas natural disasters?".

	W. Lindfield %	Auburn %
Unreported	4.1	3.9
Under reported	22.1	15.4
Accurate	40.1	46.8
Distorted	15.3	12.2
Exaggerated	13.9	15.4
Unknown/Other	4.4	6.4
	99.9	100.1

A second survey conducted in 1982, also in the Epping-Carlingford area (but with different respondents to those interviewed about disaster myths) also produced interesting data concerning media functions in natural disaster situations. Table 9 summarizes responses to three of the ten questions asked of 352 interviewees. Clearly, a majority of these respondents are concerned with accuracy, more than immediacy, of reporting. Furthermore, a large majority indicated that they were concerned to hear only information from official sources. This view is particularly interesting given the clear rejection of this viewpoint during two recent disaster-media conferences (Disasters and the Mass Media, 1980; National Emergency Services College, 1977).

Table 9 Responses to three questions asked in 1982 in the Epping-Carlingford area

	Agree %	Undecided/ no response %	Disagree %
1. In disaster reporting, getting news to the public quickly is more important than accuracy	36.6	8.0	55.4
2. In disasters, the media should function primarily as the communication arm of emergency officials rather than as news reporters	75.0	13.1	11.9
3. In order to minimize the occurrence of rumours, only information from official sources should be published during the post-disaster impact period	85.8	5.4	8.8

Collectively, the results of the various surveys reported here indicate (1) that the public is misinformed about many behavioural aspects of disaster response; and (2) some public dissatisfaction with news media handling of disaster reporting. The question then arises "Where can accurate information be obtained?". One 1982 survey asked "Can you name the official organization that can help you in a disaster/emergency?". Unfortunately, the question was rather poorly formulated so that answers such as "Police", "Fire Brigade", "Red Cross", "Salvation Army" etc were accepted as correct as well as "State Emergency Services" (or Civil Defence, Local Government Council etc). Nonetheless 41.2% of the 352 respondents were unable to answer the question. Of the 228 positive answers to the question only 79.4% could be generously judged to be correct. In other words, only 51% of the sample had any idea of the name of an organization that might help and only 18.2% could correctly identify State Emergency Services. That this organization, which pays for a one page advertisement in the Sydney (and other) telephone book/s each year, has an identity crisis is emphasized by responses to the questions "Do you keep any information on natural disasters/emergency organizations in your house? If yes, what?". More than 75% of the respondents answered "No" (or made no - response) only 18 of the 352 interviewees mentioned the phone book and it is not clear whether these informants were referring to the SES page or to the Emergency 000 phone number on the inside cover which refers only to the Police, Fire and Ambulance emergencies*. Another 26 respondents had pamphlets, manuals, encyclopedias etc. that reportedly contained specific information about at least some aspects of some natural hazards.

CONCLUSIONS AND IMPLICATIONS

Despite the difficulties with questionnaire design, implementation and interpretation four broad conclusions stem from the results reported here. On the (probably reasonable) assumption that the sample results can be regarded as indicative of the responses of a fair section of the Australian population:

* It remains a mystery to me that the lengthy list of personal emergency numbers on the inside cover of the telephone book makes no mention of SES, p38 of the (1984) book where "National Disasters and Civil Defence Information" can be found, or to the Local Government SES and Emergencies numbers. However, the inside cover does state in bold red print "For other Urgent Community Service telephone numbers see HELP REFERENCE page 6". Page 6 lists more than 60 health, welfare and service organizations but does not include State Emergency Services!

- (1) a significant proportion of the population, probably a majority, believe myths concerning human response to natural disasters. Responses to a questionnaire used in a 1982 survey in Sydney are surprisingly similar to those reported from Delaware, USA using an almost identical questionnaire.
- (2) there can be little doubt that the main source of disaster information for most respondents is the news media, in particular television.
- (3) a significant proportion of respondents are unhappy about either the quality or the quantity of overseas disaster-related information relayed by the news media.
- (4) the local natural disaster emergency service, NSW State Emergency Services, is not readily identified by a majority of the population. This may imply a poor knowledge of precautions in the community.

It is doubtful that there is much that is new in these conclusions which are of course, interrelated. Clearly, the quality of disaster reporting has to be improved if both the true nature of disaster behaviour is to be recognized and if the SES is to attain a higher community profile.

In my view a significant improvement in the quality and quantity of disaster information would result if the news media were to appoint reporters and/or subeditors/editors who have some background in the subject, for example, an ACDC course (or James Cook University seminar), a general course as taught by Macquarie University or the University of New England, and/or experience*. Most problems with reporting of natural disasters arise, in my view, from a lack of perspective or background. If an individual reporter in each media outlet had responsibility for natural disaster-related matters and such reporters were encouraged to liaise with SES, NDO, ACDC, AODRO and the various specialists in universities, CSIRO and other institutions we might see more published material on preparations and precautions, a decline in material and human convergence, and a decrease in the reporting of disaster myths about looting, panic and shock, in what Wenger *et al.* (1980) called the "Dresden Syndrome" in which the scope of impact and destructive effects are exaggerated. Unless such educational measures, which amount to no more than adequate "gatekeeping" (Waxman, 1973; Kueneman and Wright, 1975) are implemented voluntarily, further consideration should be given to restricting the publication of information from other than official sources during and after natural hazard impacts. Reprehensible as that might seem, the survey responses summarised in Table 9 indicate that such a move might attract a significant amount of public support.

* see also Britton (1983, p197-198) on the need for training of journalists.

It is worth noting that The Daily News of Longview (Washington State, USA) won the Pulitzer Prize in the local spot news category for its coverage of the Mount St Helens' eruption in 1980. The prize was won partly because of the accuracy of the The Daily News scientific reporting. According to my informants, volcanologists at the scene, every scientific statement in the paper was checked with multiple sources before and after publication!

Media-spread myths are not a necessary adjunct of disaster reporting.

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REFERENCES

- Chamberlain, E R., Doube, L., Milne, G., Rolls, M., and Western J S., 1981. The experience of Cyclone Tracy, Dept of Social Security, Comm Aust., AGPS, 191p.
- Britton, N R., 1983. The bushfires in Tasmania, February 1982 - how the disaster relevant organizations responded, Disaster Investigation Report, 6, James Cook University of Nth Qld. Centre for Disaster Studies, 202p.
- Disasters and the Mass Media, 1980, Proceedings of the Committee on Disaster and the Mass Media Workshop, February 1979, National Academy of Sciences, Washington D C, 301p.
- Foster, T. 1976, Bushfire - history, prevention, control, Reed, Sydney, 247p.
- Kreimer, A., 1980, The role of the mass media in disaster reporting: a search for relevant issues, in Disaster and the Mass Media, 9 - 31.
- Kueneman, R M and Wright, J E 1975, News policies of broadcast stations for civil disturbances and disasters, Journalism Quarterly, 52, 670 - 677.
- Larson, J F, 1980, A review of the state of the art in mass media disaster reporting, in Disasters and the mass media, 75 - 126.

- National Emergency Services College, 1977, The Media and the Disaster Scene, Report of Proceedings, Macedon, Victoria
- Quarantelli, E L and Dynes R R, 1972, When disaster strikes it isn't much like what you've heard (and read about), Psychology Today, 5 (9), 67 - 70.
- Scanlon, J., 1979, Day One in Darwin: once again the vital role of communications, in J I Reid (ed), Planning for people in natural disaster, James Cook Univ. Nth. Qld., Dept of Behavioural Sciences, 133 - 155.
- Short, P., 1979, "Victims and helpers' in Heathcote, R L, and Thom, B G (eds), Natural hazards in Australia, Aust. Academy of Sciences, Canberra, 448 - 459.
- Sood, R, 1982. Communicating for improved hazard awareness in T F Saarinen (ed), Perspectives on increasing hazard awareness, Inst. Behavioral Science, U Colorado, Program on Environment and Behavior Monograph 35, 95 - 129.
- UNDRO, 1979, Disaster Prevention and Mitigation, a compendium of current knowledge, vol 10, Public information specs, 142p.
- Waxman, J J , 1973, Local broadcast gatekeeping during natural disasters, Journalism Quarterly, 50(4), 751 - 758.
- Wenger, D E, Dykes, J D, Sebok, T D and Neff, J L , 1975. It's a matter myths: an empirical examination of individual insight into disaster response, Mass Emergencies, 1, 33 - 46.
- Wenger, D E, James, T and Faupel, C., 1980. A few empirical observations concerning the relationship between the mass media and disaster knowledge: a research report, in Disasters and the Mass Media, (1980) 241 - 253.
- Wettenhall, R L 1975, Bushfire disaster - an Australian community in crisis, Angus & Robertson, Sydney, 320p.

CONCEPTUAL ALTERNATIVES FOR THE ANALYSIS OF COUNTER-DISASTER ORGANISATIONAL NETWORKS

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INTRODUCTION

Within sociology the two sub-disciplines of Organisation Studies and Disaster Research have occasionally been combined in an effort to increase our understanding of organisations and groups of organisations, disaster events, or society in general. In some instances studies have provided insights into more than one of these three substantive areas. The significance of organisations within our western society and the influence that organisations have over most - if not all - of our everyday lives is an accepted part of twentieth century existence. It should not be surprising therefore, that when disruption to ongoing social routines are caused by an external natural hazard agent, which may result in disaster, that we again are directly influenced by the actions of particular organisations and by the decision-making responses of specific organisational incumbents.

However, within the context of a disaster event the priorities for community survival are not the same as they are in non-disaster situations. The priorities that communities accept as legitimate in a non-disaster situation are rearranged in times of disaster because they are no longer appropriate to the new social environment (Wenger, 1978). Inherent within the new arrangement of societal priorities is the re-alignment of organisations, both those who are charged with disaster ameliorative tasks, as well as organisations which have no apparent role in counter-disaster activities.

Organisations that are influential in 'normal' periods of community life may not be influential, or their ability to influence may be curtailed, under atypical periods such as the occurrence of a natural disaster event. A natural disaster, by definition, causes a temporary unravelling of the social fabric which encapsulates the processes, structures and interactions that we expect to be present within our social routines. The fragmentation of normative prerequisites following disaster that jeopardises individual and group existence also affects the survivability of organisations and organisational networks.

This disruption to organised behaviour should be expected within a disaster situation, yet it is often overlooked in terms of probable consequences following natural disaster impact; all too often, disasters are only regarded as a problem for the individual or a small group of significant others to cope with. Admittedly this is a more realistic

appraisal than the time when disaster was seen only as a matter for engineers to be concerned with, but it is still not the full story. Because our western world is so tied up with the "organizational society" (Etzioni, 1964), a lot more consideration should be given to the inter-relationships between natural disasters and formal organisations.

The consequences of disaster impact on organisations is also overlooked by officials within organisations as well as by researchers. Such a disruption is resisted by organisational personnel, whose roles within the organisation may be altered, just as the role of the organisation may be altered, due to the changing circumstances caused by the drastic alteration of the social environment. Within the organisational setting a number of changes can be witnessed following impact. Similar adjustments may occur when a natural hazard agent threatens a community. A good example of this is in Northern Australia following the issuance of a 'cyclone warning' by the Bureau of Meteorology (see Britton, 1982). Some organisations will assume a change in responsibilities; their power to initiate and enforce existing, or newly-created roles, may be increased at the expense of other organisations. The structure of an organisation as well as the task that an organisation performs may alter (Dynes, 1970). Specific office bearers in one organisation may find they not only have the power to initiate actions within their own organisational settings, but also are able to deploy the resources and direct the decision-making capacities of other organisations, thereby exhibiting the ability for role-and/or boundary-expansion. These two features have been noted in some of the studies that have been conducted on organisations within extreme environments. On some occasions, also, special legislation is brought into operation. For example, State or Territory disaster Acts can over-ride routine social processes and structures and install other contingencies in their place. This latent capability of disaster planning can alter organisational and institutional procedures, rendering normally manifest social activities both inappropriate and inoperable. The balance between networks of organisations may also be offset as the disaster event introduces a new - usually only temporary - social environment within which new opportunities for 'territorial' acquisition and boundary expansion may be created.

This paper will focus on a particular group of organisations - those that are empowered to counter a natural disaster impact within Australia. This group of organisations will be termed the 'disaster-relevant organisational network'. The emphasis in this paper will be to illustrate that there are forces within this specific organisational network that operate to reduce the overall effectiveness of counter-disaster measures. Further, the paper will show that there is a hierarchy of organisations within this network. Within this hierarchy, organisations with the greater amount of power and influence

need not necessarily be the organisations with the most potentially effective or appropriate counter-disaster resources. These powerful organisations may not utilize their resources as well as they could during a disaster event. Conversely, the organisations at the lower end of the hierarchy, those which may have the greatest potential for effective action within a disaster context, may be prevented from optimizing their role. 'Higher-order' organisations are able to manipulate the external environment affecting the performance of the 'lower-order' organisations, as well as the internal functionings of these organisations. These actions reduce the overall effectiveness and efficiency of the disaster-relevant organisational network. Because of the specific characteristics of the 'higher-order' organisations it is necessary to develop a new taxonomy that recognises the implication of these characteristics toward overall effectiveness in organisational response. Therefore, a taxonomy developed on the basis of the ability of organisations within the disaster-relevant organisational network to:

- (i) influence the direction of the organisational network; and
- (ii) determine the organisation's own role within that network will be introduced and discussed.

Some examples will be drawn from the recent wildfire situations experienced in Tasmania (1982) and Victoria (1983) to illustrate the general concept. Prior to this, however, a brief discussion will be provided which will set out what I mean by a 'disaster' and what the important components are in the condition we refer to as a 'disaster'.

WHAT ARE DISASTERS ?

The word 'disaster' is a descriptive label that has been employed by a diverse range of people to explain a wide variety of different situations and consequences. Four main categories of usage within the disaster literature can be discerned. First, disaster often refers to a destructive agent (for example, a tropical cyclone, wildfire, earthquake, or flood). Second, disaster also refers to the physical impact which that agent has sustained (for example, loss of life; damage to property). Third, disaster can also mean the evaluation of the physical event (that is, evidence of physical damage is evaluated as being disastrous). Lastly, disaster can also refer to the psycho-socio-economic disruption created by the physical agent (See Dynes, 1970).

These four categories of 'disaster' are augmented further by the popular usage of the term. This leads to greater confusions of the meaning of the term, a situation that is probably generated by the fact that the word 'disaster' is used to describe any number of different types of unfortunate, unpleasant or unexpected events that occur to people. This confusion is further compounded by people's insistence on

using 'disaster' to describe not only situations that affect large groups of people, but also unpleasant, unfortunate or unexpected experiences which affect only individuals. Thus, one reads of a 'personal disaster', through to a national disaster. 'Personal disaster' is a gross misuse of the term, because disaster refers to collective stress situations not individual plights, whatever the cause may be.

The best way to describe the term 'disaster' is to look at the difference between 'disaster' and that of 'accident' and 'emergency'. These terms are often used as synonyms by people ("My car accident was a disaster!!"), but in reality these three terms have strict definitions. In order to point out the difference between these terms, and to illustrate just what a disaster is, three parameters will be used:

1. the number of people affected;
2. the degree of involvement of people within the affected area;
3. the amount of disruption caused by the event in question.

(Britton, 1983a)

An accident can be defined as having the following properties:

- A. Both the immediate and the long-term consequences of the incident are restricted in geographical area; that is, it is an extremely localised event.
- B. It is restricted to a small group of persons involved plus their significant others. 'Proximal others' may be involved, but the long-term consequences, if there are any, will not usually affect these 'proximal others'. An accident involves only the disruption of a specific interest group which is composed mainly of the victims plus their significant others.
- C. There is little, if any, disruption of 'generalised others' within the greater population of the community. There may be slight disruption around the immediate incident site (for example, a road may be blocked because of a vehicle accident), but these disruptions are minimal.

Emergencies in many respects, can be regarded as 'mass-accidents'

- A. The geographical area which an emergency covers is still localised, but need not be as narrow as that which typifies an accident (for example, the 1980 Bilbao, Spain school explosion; the 1981 Las Vegas Hilton hotel fire).

PARAMETERS: (1) Number of people involved
 (2) Degree of involvement of population within the 'affected' social system
 (3) Amount of disruption by the collective-stress agent on the social system

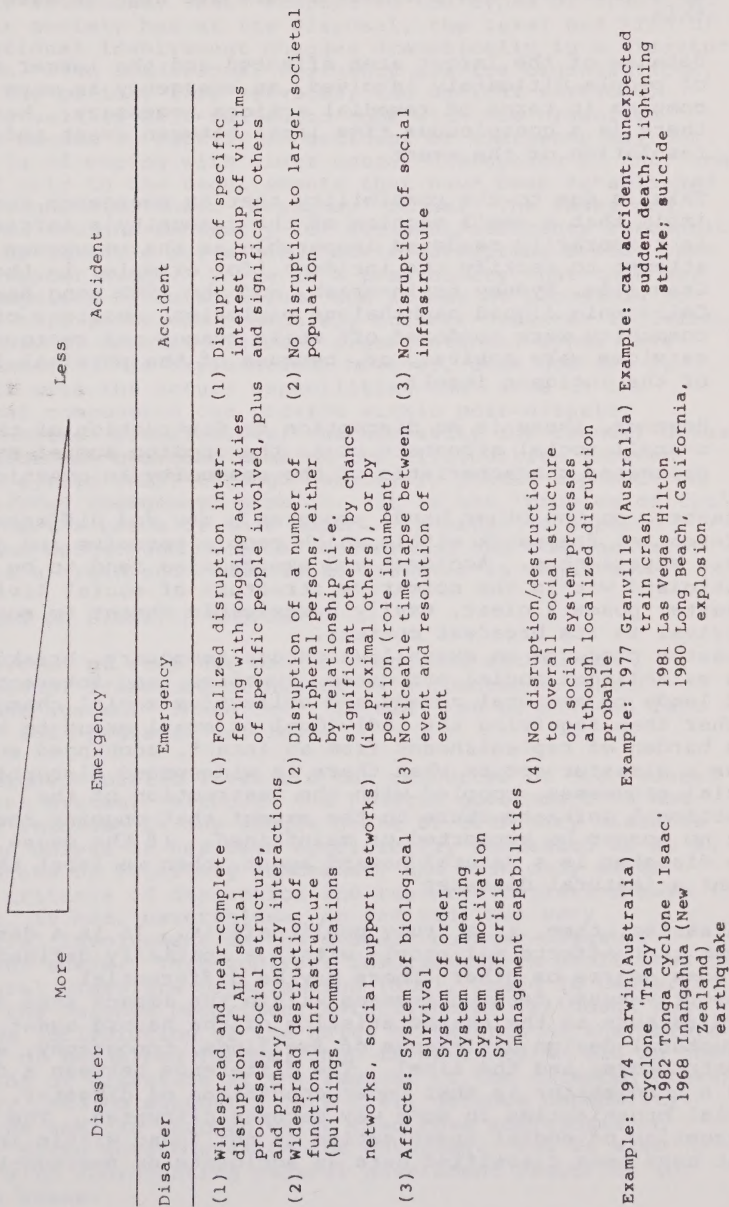


FIGURE 1 : CONTINUUM OF COLLECTIVE STRESS

- B. The number of persons directly involved as participants (victims and helpers) can be substantial, and the numbers of significant and proximal others are high because of this.
- C. Because of the larger area affected and the larger number of people ultimately involved, an emergency is more complex in terms of remedial actions necessary; hence there is a conspicuous time lapse between event and the resolution of the event.
- D. This is due to the possibility that an emergency can also imply that a small section of the community's infrastructure is temporarily rendered inoperable as the emergency services attempt to rectify the incident (for example, in the 1977 Granville, Sydney train-crash, and the 1980 Long Beach, California liquid naphthalene explosion, sections of the community were cordoned off while rescue and restoration services were active), or, because of the physical impact of the incident itself.
- E. However, there is no disruption or destruction of the overall social structure or to the ongoing social system processes characteristic of the community in question.

Disaster, on the other hand, produces a new and different referential framework within which people perceive and judge their experiences. Accident and emergencies tend to be routinised within the normative structure of social living. Disaster poses a clear, easily perceivable threat to social survival in its broadest context.

Disaster produces an overall, although temporary, breakdown in the established social processes, routines, and interactions, and leads to societal remedy and collective social change, rather than requiring the individual or small group to bear the burden of replenishment from an intact, unchanged society. Thus a disaster occurs when there is widespread disruption of social processes, coupled with the destruction of the functional infrastructure to the extent that ongoing routines can no longer be supported or maintained. If the cause of the disaster is a natural hazard agent, then we label that event a 'natural disaster'.

A disaster, then, is a truly public affair. It is a destructive agent that affects all people within a spatially defined area to some degree or other (there may be differential disruptiveness/ destructiveness within the impact zone due to such factors as the characteristics of the hazard agent, structural design difference of dwellings, topography, soil substructure, and the like). The difference between a disaster and a nondisaster is that under conditions of disaster, social organisation in some way becomes disrupted. The disruption of social organisation is not found within incidents that have been classified here as accidents or emergencies.

The disruption of societal infrastructure through disaster introduces another feature not found within an accident or an emergency situation. With respect to the types of organised behaviour society has at its disposal, the level and kind of organisational involvement changes dramatically in a disaster situation. The traditional emergency service organisations, that is the police, fire services, and medical services, which are usually well-suited to cope with the organised response needed to rectify an accident or emergency may not be capable of coping with wider social disruption if they are confined only to the requirements that have been established for the conduct of their 'everyday' roles. The tasks and structural designs necessary for accident/emergency resolution may not be suitable for a large-scale disrupting event; that is, a disaster event. There is a possibility that this has been recognized by authorities, and it may be plausible to consider this to be one reason why counter-disaster legislation and additional counter-disaster organisational-types have been created. This explanation, however, does not fit in very well with the actual capabilities that some of the additional components can provide within post-disaster circumstances. Nevertheless, the necessity for counter-disaster legislation has overcome some of the difficulties inherent within a system that, through necessity, places emphasis on the 'everyday emergency' problem. It is the 'problem of fit' that forms the basis of this paper. In order to explain this, some background material concerning the components of Australia's organised response to disaster is required.

THE LEVELS OF DISASTER RESPONSE

Four 'levels' of response can be discerned within the institutional framework of Australia's counter-disaster management system. These four 'levels' can be divided into 'public' and 'private' settings.

At the highest public level are the resources of the Federal government system. Although the Federal government is not directly involved in any single State or Territory disaster situation unless it has been specifically requested to do so by the State or Territory concerned, and then only after certain criteria of disruption and resource depletion have been met, it has, nevertheless, an indirect but very influential involvement in the overall counter-disaster management scene. This indirect involvement is manifested by the Natural Disasters Organisation (NDO), based in Canberra. Part of the Defence Department establishment (although not under the jurisdiction of the Chief of Defence or the Chiefs of Staff of the Armed Forces), NDO is designed to aid in the mitigation of disasters at the request of the affected State/Territory, and to support a core civil defence capability. NDO is the vehicle through which resources additional to Local or State governments can be obtained. NDO is also charged with coordinating Federal government resources for stricken areas.

In addition, this organisation provides material to the S/TES that NDO considers appropriate for disaster response and recovery operations. The salaries of some 75 permanent S/TES staff is also met by the Federal government through NDO. The Defence Department also operates a training school (the Australian Counter Disaster College - ACDC) which in the past has provided skills training and management techniques to S/TES permanent and volunteer personnel. The school has also run courses for other specific interest-groups, such as media representatives, veterinarians, and welfare officers.

At the Federal level considerable technological resources are available, such as the Department of Science and Technology's Bureau of Meteorology which operates from decentralized regional offices to provide a comprehensive weather/climate data-base that aids the emergency services in floods, cyclones, wildfire and severe storm relief. The Commonwealth Scientific and Industrial Research organisation (CSIRO) also has specialist personnel and equipment for assisting disaster mitigation actions.

The next public level is the State/Territory government. State governments have legislative mandates to establish and engage emergency management activities. In this respect, the State level is independent from the Federal system: it is up to the individual State or Territory whether or not disaster legislation will be introduced, promulgated or enforced. It is also up to the individual State government to decide what requirements are necessary for counter-disaster activities, what organisations will be responsible for aspects of counter-disaster operations, and what authority each organisation shall receive in order to ensure these functions will be carried out. Of the six States and two Territories that constitute the Commonwealth of Australia, two have no counter-disaster legislation. The remaining six have had Acts of Parliament for varying periods of time, with variably apposite disaster management statements enclosed within the Acts:

- 1972 New South Wales State Emergency Services and Civil Defence ACT
- 1975 Queensland State Counter Disaster organisation Act
- 1976 Tasmania Emergency Services Act
- 1976 Northern Territory Disaster Act (repealed 1982)
- 1980 South Australia State Disaster Act
- 1981 Victoria State Emergency Services Act (also 1983 State Disaster act).

Four of these Acts lay the framework for the establishment of a specific counter-disaster organisation (Queensland, Tasmania, Northern Territory, Victoria). The other states, including the two which have not yet passed legislation, also have a State or Territory Emergency Service organisation operating in some capacity within the emergency management system; in all cases these organisations started out as volunteer-based civil defence units. The respective legislation in the four States mentioned above turned these organisations into the present S/TES system.

In addition to the S/TES, the Acts of Parliament also introduced the concept of a State Disaster Committee (SDC or its equivalent - the names vary within the various States and Territories), whose task is basically to oversee all aspects of coordination associated with counter-disaster planning and operations).

Police Departments play a major role in all States within disaster management operations. The Commissioner of Police assumes a very decisive role as a high-ranking incumbent in either the State Disaster Committee (in Tasmania and the Northern Territory the Commissioner is the chairman of the SDC), or the S/TES (in Tasmania and New South Wales the Commissioner is the Director of S/TES). He can also be the State Disaster Coordinator (a position he holds in Northern Territory and South Australia). In a number of other states the S/TES is under the direct responsibility of the Police Commissioner for the conduct of its operations during emergency periods. In all States and Territories a senior police officer assumes the role of regional (sometime called division) disaster coordinator (or controller).

In each state the traditional emergency services - the fire services, police departments, medical services, and welfare/social security departments - assume the role of a 'lead combat authority' who have responsibility for the coordination of hazard-elimination operations. Some specific hazard-agents have been given to various S/TES for them to act as lead combat authorities, for example New South Wales State Emergency Service (NSW SES) is responsible for floods; Victoria State Emergency Service (VIC SES) for wind-storm damage.

The last public component within this system is the Local government. It is at the local level - the local community - that counter-disaster activities have to be implemented, because it is at this level that the physical impact of the disaster agent is usually experienced. Depending on a number of factors, however, the resources available for disaster mitigation and immediate self-help following impact may not be sufficient at this level. The type of activities that any community will initiate in response to disaster and emergency management will be dependent on the available resource-base. One of the resources that can be operationalised are the people themselves. Trained volunteers can complement the local police, fire services and medical services, and in many cases they do. Volunteer-based fire services and medical corps are more the rule in smaller communities than are professional salaried personnel, who epitomise the emergency services of larger urban centres. Whatever the population size and material resources of a community, the available human resources need to be coordinated into a viable operational system. In most states within Australia the S/TES is charged with establishing local voluntary emergency service units (LVES). It is the responsibility of the LVES to train local citizens to be an effective augmentary cadre capable of working alongside the professional emergency service personnel, thereby increasing the overall capabilities of the local

government system in the face of community disruption. How successful the LVES is in achieving this is dependent, amongst other things, on the skills and knowledge of the trainers, the resources available for educating both students and teachers, the cooperation of existing emergency services in accepting the potential resource, and the planning arrangements that are available to implement a volunteer service and to operationalise it.

Apart from employing the available 'raw materials' that any community has to offer, the Local government organisation level is also responsible for developing plans that effectively utilize the available resources. It is well-recognised that 'grass-roots' planning for emergency preparedness is an appropriate means of combatting threats. However, it is surprising to find that very few states have placed local counter-disaster planning as a mandatory prerequisite. In the majority of cases local planning for disaster mitigation is discretionary. There is no enforcement of Local government obligations to develop planning for natural hazard threat, or, for that matter, any threat situation (apart from enemy attack, which is a Federal government matter).

The fourth and last level within Australia's system of institutional arrangements are the private organisations. These can be of two types: They can be organisations that exist primarily to fulfill roles in some or all phases of disaster management. This type of organisation - the volunteer organisation - is represented by the Red Cross and the Salvation Army. The second type of organisation is one that routinely pursues private lines of business unrelated to emergency management, but whose resources can be turned to disaster-ameliorative usage (such as heavy machinery belonging to a private construction company that is used for debris clearance). The private sector includes organisations that are national in scope as well as those with regional or local focusses. This group of organisations can provide a vast array of resources, expertise and experience. It is the responsibility of the State and the Local level systems, however, to incorporate these private organisations into the planning arrangements in order that this resource potential to be effectively used.

DISASTER-RELEVANT ORGANISATIONS AND EMERGENCY-RELATED ORGANISATIONS

One approach to looking at the disaster management system is to focus on the task-specificity of the organisations that make up the system. Various studies have been conducted that have devised labels appropriate to the type of formal, complex organisations which become involved in events that follow from natural hazard impact. Labels such as "major crisis organisations", "emergency organisations", "community emergency organisations", and "crisis-relevant organisations" have been used by researchers interested in the sociology of natural

hazard and disaster. The labels so applied are always broad in terms of the organisations that can be subsumed under those labels, with little attempt apparently being made to differentiate between the innumerable activities which are necessary following an impact. There is no temporal distinction, for example, implied in any of the labels mentioned above that can assist in differentiating one phase of post-impact from another. This is surprising because it is known that different organisations have priority over others within a disaster situation because of the specialised services or the domain a specific organisation has (one must keep in mind, when referring to phases in disaster, that disasters are processural, hence the 'phases' that have been identified by some researchers can be expected to blend into each other). Rather than isolating groups of organisation, these labels have been used to describe all the organised activities which follow impact, including all the formal and informal, public and private organisational responses for all phases identified with the immediate post-impact and early restorative periods of a disaster.

Another problem which complicates things is that clear distinctions between organised responses is difficult to achieve because of the inter-dependence of one 'type' of organisation on the performance of another organisational 'type' (for example, a fire truck may have to wait until a public works grader clears the road before firemen can gain access to burning structures). However, there is value in attempting to differentiate organisational response using organisational domain and community values as focal criteria within a broad time-order specification, so that the importance of organisations which become involved during disaster can be more clearly illustrated. Within this specification a two-fold categorization has been developed, which is outlined below (see also Britton, 1983b).

The term disaster-relevant organisation (DRO) is applied to refer to a set of task-specific organisations within a community whose legislated and, in most instances, legitimated activities require that they be the vanguard of any organised attack upon the consequences and implications of a hazard agent. The publicly-acknowledged tasks of these specific organisations are concerned directly with avoiding any disruption to the status quo within the social system, and of saving and preserving lives and/or property. This set of task-specific organisations includes the police, the fire services, medical services, the S/TES, and (indirectly in the case of natural disasters) the NDO. Of course, whether all of the above become involved in any particular situation, and the extent of their involvement, depends, among other things, on what the threat is and what the presumed consequences are, both in the long and short-term. DRO's represent a community's frontline force for the organised response to anticipated emergencies, and for the amelioration of unanticipated disaster impacts. They are also the organisations with the

responsibility of disaster mitigation.

The importance of saving lives and property is reflected by the high priority this value has in our society. DRO's epitomize the enactment of this value because members of society have conferred upon these organisations the duty of safeguarding, restoring and maintaining human life and human possessions. By grouping these organisations into a specific category the actions commensurate to the importance of this value as an organisational domain is highlighted; and the role of these organisations is enhanced. The DRO's are usually the first-called organisations cannot act alone, and they are not capable of restoring the disrupted social system back to its pre-impact (status quo) level without the assistance and the integration of other organisations. Hence, the inter-dependence mentioned earlier.

The term emergency-related organisation (ERO) is applied to a collection of organisations which can be either public or privately owned, whose primary contribution is to maintain and service the physical appurtenances within society, and to provide general welfare and relief facilities during periods following disaster or other collective stress situations. This label comprises all those organisations which are essential to the effective restoration of an impact zone. ERO's consist of organisations such as the Red Cross Society, Salvation Army or other religious/volunteer welfare-oriented agencies, as well as state or federal welfare departments; the city or country councils, electricity and gas utilities, main roads departments and insurance companies. Also within this collection of organisations are the public information and media dissemination agencies. The prime responsibility of this sub-group is to collect, collate and disseminate information about the disrupting event to the wider interested and concerned community.

Within this two-way split of organisations, six specific organisational types can be discerned: three types or organisations related to the DRO's, and three to the ERO's:

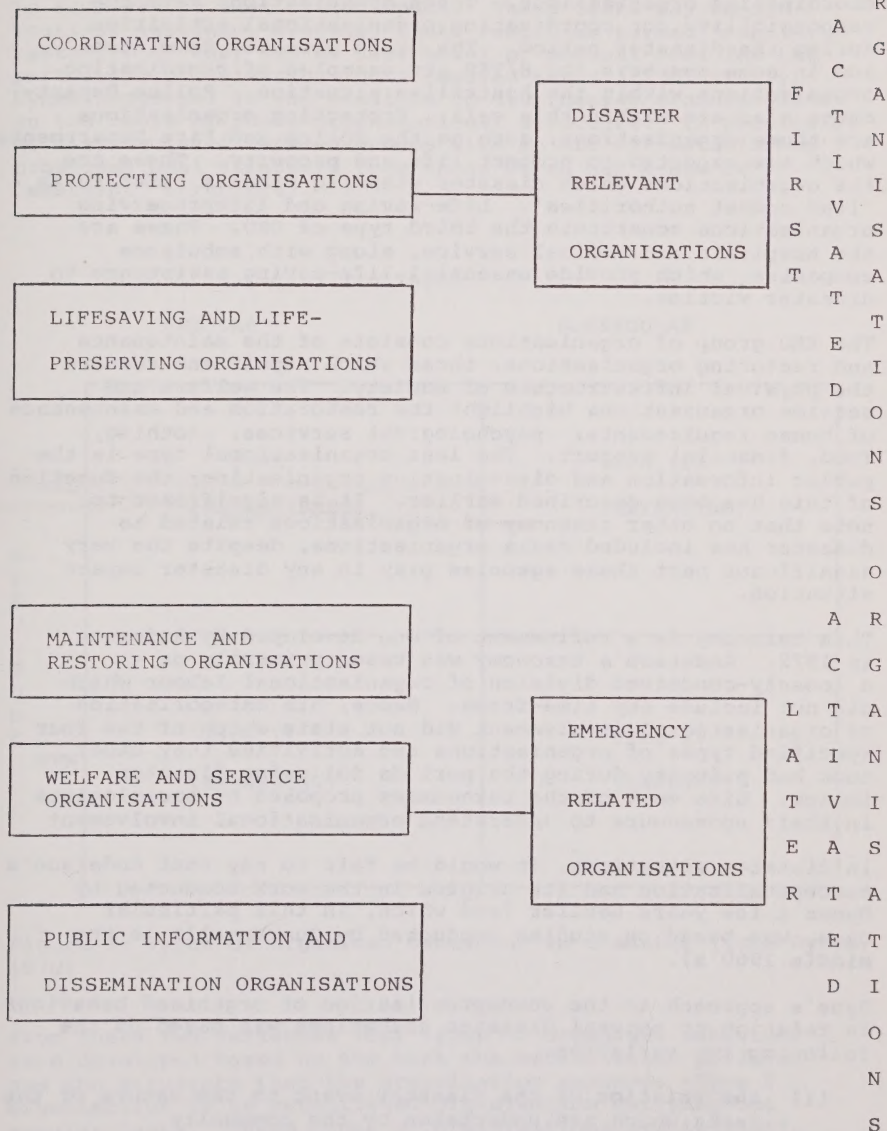


FIGURE 2: TYPES OF DISASTER RELEVANT AND EMERGENCY RELEVANT ORGANISATIONS

Within the DRO group, the first type of organisation is the coordinating organisations. These organisations have the responsibility for coordinating organisational activities during the disaster period. The State Disaster Committees and in some respects the S/TES are examples of coordinating organisations within the Australian situation. Police Departments also are within this cell. Protecting organisations are those organisations, such as the Police and Fire Departments, which are expected to protect life and property. These are the organisations which disaster planning manuals refer to as 'lead combat authorities'. Life-saving and lifepreserving organisations constitute the third type of DRO. These are the hospitals and medical service, along with ambulance companies, which provide essential life-saving assistance to disaster victims.

The ERO group of organisations consists of the maintenance and restoring organisations, those which repair and restore the physical infrastructure of society. The welfare and service organisations highlight the restoration and maintenance of human requirements: psychological services, clothing, food, financial support. The last organisational type is the public information and dissemination organisation; the function of this has been described earlier. It is significant to note that no other taxonomy of organisations related to disaster has included media organisations, despite the very significant part these agencies play in any disaster impact situation.

This taxonomy is a refinement of one developed by Anderson in 1972. Anderson's taxonomy was based primarily on a loosely-conceived division of organisational labour which did not include any time-frame. Hence, his categorization of organisational involvement did not state which of the four specified types of organisations and activities they undertook had priority during the periods following disaster impact. Like most of the taxonomies proposed by sociologists in their endeavours to understand organisational involvement

in disaster situations, it would be fair to say that Anderson's conceptualization had its origins in the work conducted by Dynes a few years earlier (and which, in this particular case, was based on studies conducted by Quarantelli in the middle 1960's).

Dyne's approach to the conceptualization of organised behaviour in relation to natural disaster situations was based on the following two variables:

- (i) the relation of the disaster event to the nature of the tasks which are undertaken by the community organisations; and
- (ii) the post-impact structure that these organisations developed as a result of the disaster event.

Dynes stated that in every disaster situation a number of different types of organisations carry out tasks that assist in some way to ameliorate impact. These tasks may be old, routine, assigned, everyday tasks (which he termed 'regular tasks') , or they may be new, novel or unusual ones for the particular organisation ('non-regular tasks'). Similarly, Dynes suggested it was possible to distinguish organisations on the basis of their organisational structure. In particular he distinguished between groups with an old or 'established' organisational structure from those which had a new or 'emergent' structure.

		TASKS	
		REGULAR	NONREGULAR
S T R U C T U R E	OLD	TYPE I (ESTABLISHED)	TYPE III (EXTENDING)
	NEW	TYPE II (EXPANDING)	TYPE IV (EMERGENT)

Figure 3: Types of organised behaviour in disaster (from Dynes, 1970)

From these two variables four types of organised behaviour were developed based on the task the organisation performs and the structure that the organisation assumes. Type I organisation is an established organisation carrying out regular tasks. These types of organisations are initially involved in any community emergency (the term 'emergency' has been used to describe all three types of collective stress situations mentioned earlier). There is a public expectation that they will be involved, either on the basis of previous

activity or by the definition of the emergency relevance of the organisation. Because of their pre-existing structure these organisations can mobilize quickly and efficiently.

Type II organisation is an expanding organisation with regular tasks. These organisations are most often the results of community or organisational planning. The organisation exists on paper and the core of it exists prior to the disaster event. These organisations usually become involved next after the established organisation. They are in a state of readiness and both the expectations of the community and of the organisational personnel themselves move them towards mobilization and involvement. These organisations tend to be mobilized in the event of anything but a most localized accident, but their mobilization is slower because they have to bring in voluntary personnel to increase the small cadre of permanent officers.

Type III organisation is an extending organisation which undertakes non-regular tasks. This is best illustrated by the example provided previously of the construction company utilizing its men and equipment to dig through the debris and assisting rescue operations following impact. They are possibly the most numerous organisational group. The usual task of the group is disrupted by the disaster, or the achievement of their usual task seems inappropriate within a disaster situation, and hence the efforts of this group become diverted into disaster activities.

Type IV organisation is an emergent organisation engaging in non-regular tasks and is usually the last type of group to become involved. Its development is brought about by the inadequacy of the first two types of organisational groups to satisfactorily fill all the requirements and gaps that have been created by the disaster situation. For example, an emergent organisation may be an ad hoc group of people who have got together to direct search and rescue operations because none of the other groups has considered the necessity to undertake such a task through their pre-disaster and post-disaster planning arrangements. Emergent groups tend to take on new tasks that have not been incorporated into the overall counter-disaster strategies adopted by the established or expanding organisations.

This particular taxonomy spawned a vast number of subsequent disaster studies related to organisational response to disaster. The taxonomy which we will concentrate on for the remainder of this paper has recently been conceptualized (Britton, 1984a, 1984b) and follows the tradition of disaster sociology by having its roots placed within Dynes' pioneering work. The focus of this study is the Australian State and Territory Emergency Service organisation (S/TES). In terms of Dynes' categories, Australia's S/TES does not fit neatly into any of the four organisational types. The nearest it gets to Dynes' formulation is to straddle both the 'established' and the 'expanding' organisational types. It has characteristics

of both types of organisations. The task is similar to that described within the 'established organisation', yet its structure is more like that suggested by the "expanding organisation". This problem is not as important, however, as the difficulties that are encountered when explanations of the relationships between the organisations that make up the disaster-relevant organisational network are attempted (as indicated in Figure 2, most of the DRO's fall into Dynes category of 'established organisations'). Another conceptualization is required if we are to understand how the organisations that are charged with countering the effects of a natural disaster inter-relate when operationalised. A step in this general direction has been made with the development of a taxonomy which focusses on how power in the form of control and influence is shared amongst the organisations that form the counter-disaster network.

THE S/TES AS A "CONSTRAINED ORGANISATION"

Within any ideal counter-disaster organisational network there is a necessity for a specific organisational arrangement to be established that is dedicated to counter-disaster/emergency management activities, and not to have disaster coordination and control incorporated within the functions of an existing organisation. There are a number of reasons for this: Traditional organisational roles become considerably stressed in times of social crisis periods because of an increase in role demand and role expectations. This may hinder the organisation from effectively implementing additional roles that are relevant only in times of disaster. Counter-disaster management is only a part of the functions that the counterdisaster organisations perform. As it is not a continuous function in terms of everyday organisational demands, resources within the organisation have to be channeled from the more routine types of activity when disaster strikes. The high likelihood that disaster-management is a secondary organisational task may also imply that personnel are not as highly trained for this task as they are for the primary organisational tasks (special training and knowledge is necessary for appropriate disaster management actions). This factor may introduce a time-lag between impact and effective organised response. Also, if there is no dedicated coordinating/controlling organisation, communication between DROs may be undesirably slow because each organisation will, for a time, remain linked in to its routine communication linkages, attempting to determine the extent of disruption through its own network first as it responds to the increased demands placed on it by the public. Only when the realization occurs that the event is of disaster proportions - which may not always be obvious in the initial stages of crisis development - will individual organisations 'hook' into an inter-organisational system that will eventually tackle the problem on a united front.

Barton (1960) identified these problems and suggested a resolution to them by introducing the concept of the 'synthetic organisation' (see also Thompson, 1967). It refers to a temporary inter-organisational system whereby the multiplicity of responding units are coordinated and would alleviate many of the difficulties confronted by emergency organisations as they face both traditional role demands and new role demands. It is in the attempt to set up something similar to a synthetic organisation that one can see the rationale for the establishment of the S/TES's. Unfortunately, the establishment of this organisational type was compromised even before the final organisational design was thoroughly developed. The new organisation was seen as a threat to the prestige, placement and influence of the traditional organisations who were happy with the way things had been in the past.

In order to illustrate how the dominant coalition of traditional disaster-organisational officials have compromised the position of the S/TES, seven variables related to the effectiveness of the organisation will be looked at. The seven variables are: the legislative base; the power base; resource allocation; organisational autonomy; organisational domain; recruitment of senior staff; and organisational legitimisation. The influence that the dominant coalition has over the S/TES through their influence over these variables is an important consideration in the development of the new taxonomy.

1. THE LEGISLATIVE BASE

A feature of the legislation related to the development of the S/TES is the influence that senior officials within the traditional DROs appear to have had in moulding the final legal base - either that, or the Acts of Parliament related to counter-disaster actions can be cited as examples of the inadequacy of the legislative process. Enclosed within most counter-disaster legislation are clauses that enable senior officials within the existing DROs to enhance the position of their organisation within the disaster management system, and/or to ensure that existing organisations will not be encumbered by the creation of a new organisational type. The implications of these practices for the eventual effectiveness of the newly-created organisation, or indeed the disaster management system itself, was obviously overlooked. As specified within the Acts, most of the S/TES are answerable to their respective Commissioners of Police (the exception being Queensland SES which is responsible to the Coordinator-General), who, under the legislative framework has direct influence over the S/TES in operational aspects. In some cases, this influence is continued in non-operational, routine matters.

In these circumstances the Police Commissioner's appointment to the State Disaster Committee (as Chairman) or to the S/TES (as Director) makes this possible.

While these roles enable the Commissioner to influence every DRO in times of emergency operations, none are so directly influenced as are the S/TES. Most, if not all of the traditional DROs have other legislative frameworks that can protect them from external interference to some extent. In addition, the roles that these other DROs perform as lead combat authorities often act as a barrier to encroachment by other organisations. Unfortunately for the S/TES, the roles that they have been tasked with are, in many cases, not as specialised as some of their "peer" organisations. Most of their tasks could be undertaken by other organisations. The legislation associated with the S/TES is interpreted as making them a 'support organisation'. With the exception of some S/TES' being given lead combat roles under certain hazard situations, this is probably an appropriate interpretation of their role. However, every DRO that is not assuming a lead combat role at the time is also a support organisation. What is apparent, in the case of the S/TES is that the interpretation given to the type of support that they perform is more a 'secondary support' role, and it may not always be regarded as essential support. In some recent situations in States where the counter-disaster network has been activated, failure to inform the S/TES that disaster operations were in progress until later in the development of the crisis supports this suggestion. With the legislation being interpreted this way, and the influence that senior officials from other organisations have on the content of the legal base, S/TES's do not have much opportunity to exert their capabilities.

2.

POWER BASE

It was only during the 1970's that State and Territory governments actually placed S/TES's under ministerial responsibility (see Wettenhall, 1980). In most cases the minister for this organisation is the Minister for Police, whose title was later expanded to Minister for Police and Emergency Services (to cover all DRO's). The late start in being attached to ministerial liaison has no doubt jeopardised the S/TES access to top-level decision-making processes and resource allocation bids in the formative years of the organisations's life-cycle. This has probably contributed to the 'stunted' development of the organisation. It is possibly a factor associated with the lack of legitimacy afforded the S/TES by other DRO's.

3. RESOURCE ALLOCATION

The S/TES are dependent on external organisations and host communities for many of their essential material resources. Certainly, they are dependent on their host communities for volunteer membership. The dependence on the host community means that many essential items may not be available for some years until the local community is aware that specific hardware is necessary, and which has not been provided by the NDO (which is the source of the majority of standard counter-disaster material resources). Thus, there can be a gap between awareness of the necessity for an item and the eventual procurement of it as the LVES and local government attempt to acquire the monies to purchase the item/s. This often means canvassing the community for sponsors and donors - activities that take the volunteer members of the S/TES away from their tasks of counter disaster training and preparedness. Because of budgeting constraints and limited freedom to procure items other than those available through official channels (i.e. that are on the 'shopping list' primarily made up by NDO), there are limitations placed upon the organisation in its build-up of materiel. Similarly, the human resource allocation is smaller for this organisation than for any other DRO. There are obvious reasons why this should be so in terms of the differences between primarily volunteer-based versus professional organisations; the difference between 24-hour services and 'regular office hours' organisation and the like. However, what should be addressed is whether or not the human resources that are available within the S/TES, especially at the level of permanent officers, is sufficient for the types of operations the organisation is meant to perform, and at a level which is optimal in terms of community requirements during crisis periods. It is this perspective which suggests that the number of permanent staff is grossly insufficient. This is acutely evident when a natural disaster or large-scale emergency is in operation for any length of time.

4. ORGANISATIONAL AUTONOMY

The extent to which the S/TES is able to control its own affairs without external interference is significantly curtailed, both in non-emergency and operational phases. At the root of this constraint lie the power-holders within the counter-disaster organisational network. The S/TES has three external 'bosses' to which the Director, if he is not the Police Commissioner or a seconded police officer, is answerable. The Director-General NDO, the Police Commissioner, and the Minister responsible for emergency services are all capable of influencing in a most direct fashion the operations of the S/TES (the exception to this situation is, again, Queensland, whereby the Coordinator-General rather than the Commissioner of Police has influence; however, the degree of control meted out to QSES is less than other states because of its narrower role within emergency management).

Where the Police Department has daily governance over the S/TES, for instance, when the Commissioner of Police is also the Director of S/TES, autonomy for the organisation is reduced because there is a direct monitoring capability that can be used to check the activities of the organisation, and if need be, re-direction can take place immediately. Furthermore, the ability to control the organisation in a direct manner because of this dual leadership also means that there is a ready access for immediate control of the organisations' resources. An 'external' Director (i.e. the Commissioner of Police or his delegate) may not see the necessity for particular resource allocation/acquisition in the same way that an 'internal' Director may - the 'internal' Director is probably looking at resource acquisition in terms of organisational survival as well as utility (all organisations have multiple goals, and some of these include methods to ensure organisational survival).

Similarly, the influence of the NDO in its resource allocation is able to directly influence the capabilities of the state S/TES HQ as well as the LVES. There are many instances in a number of States where the type and quantity of material resources supplied by NDO has been inappropriate to the requests of the organisation and to the local requirements. This appears to be exacerbated by the 'one-way' communication process between NDO and the S/TES.

5. ORGANISATIONAL DOMAIN

In a paper prepared by the Legislative Research Service section of the Department of the Parliamentary Library, for the Commonwealth Parliament, Dunn (1983) suggested that counter-disaster organisational frameworks fell into two broad types. First, were the networks which had as their 'control groups' the State Disaster Committees and the S/TES. These would call for support from the DRO and ERO's at the appropriate level within the community, and together, this system would combat the disaster agent and attempt restoration of the affected impact zone. In the other type, the State Disaster Committee would be the only 'control' group, and would nominate a lead combat authority to assume command of eliminating the disaster threat. Following this, the State Disaster Committee would organise the support organisations to restore the community. The S/TES would be part of this support group.

In practice, however, these two planning frameworks do not appear in quite the way as Dunn implied. In the first type the practice appears to be to reduce the involvement of the S/TES and instead centralize the decision-making (or 'control') within the State Disaster Committee and the State coordinator. The chairman of the Committee is usually the Police Commissioner, who can also be the State or Territory Coordinator. The Police Department then oversees the coordination of DRO activities. In this arrangement

the S/TES is used as a 'back-up' service when and if the necessity arises. In the second type of organisational plan the role of the S/TES is more often than not immersed within the operations of the traditional DROs. In this manner, the S/TES has to 'fight it out' as best it can with its more powerful colleagues. In both cases the difficulties experienced by the S/TES is tied up with the lack of understanding about the role the organisation plays. It is quite astonishing to realise the level of misunderstanding that has been permitted to continue for so long within the ranks of the disaster-relevant organisational network; it is apparent throughout the entire net. This lack of understanding over the role of the organisation affects the domain effectiveness of the S/TES. If the domain of the organisation is not well-known, or is misunderstood, or if the roles of the organisation have been blurred because of imprecise role definitions, the organisation is likely to be neglected because its part within the network is unclear. This is precisely what is happening to the State and Territory Emergency Service organisations.

6. RECRUITMENT OF SENIOR STAFF

Until very recently senior officials with the 'independent S/TES' - those at the level of Director and Deputy Director - were pre-selected on the basis of their previous association within the armed services. There was a slight deviation in some states with the 'second generation' Directors when some were selected from the Police Department (on secondment), as well as from the armed services. In some instances, such as the South Australian State Emergency Service (SA SES) the directorship has recently been given to an individual with occupational experience outside of these two 'traditional' areas (although the new incumbent had service in the SA Police previously). Such a narrow recruitment base for the top jobs within the organisation must have an effect on the direction the organisation takes. It is difficult to imagine the S/TES having a 'personality' different from the NDO or the Police if people are recruited from one to the other with little or no entry by people with additional necessary skills from other agencies.

Furthermore, there is no career progression within the S/TES, nor is there likely to be such a career structure in the foreseeable future. This means that people who have the skills and knowledge that are necessary for directing a counter-disaster organisation (and these skills can be acquired from outside the military and police systems) would in all likelihood have little interest in joining an organisation that has no job prospects.

This situation is quite different from any of the other DRO's and both the public and private ERO's where a bureaucratic model predominates, which provides a clearly recognized occupational ladder and incremental rewards. Secondment from

established DRO's and occupying senior positions with former armed services personnel is but one way to fill directorships.

7. LEGITIMATION

If an organisation is poorly regarded, even in only relative terms, it will not have the legitimacy it needs to compete effectively. In such situations goal attainment and long-term, organisational survival may be in doubt. It is doubtful whether the S/TES has become an accepted part of the Australian counter-disaster organisational network in Australia. The S/TES's were established partly because of the perceived inability by the traditional organisations to cope with the emergency management requirements experienced in a string of disasters that occurred within a narrow time sequence (1967 to 1975). The S/TES's were established as part of the counter-disaster re-organisation that followed this period, and were designed to fill some of the gaps within the old counter-disaster network to increase the effectiveness of the entire system. However, in order to perform any roles within the net, the S/TES were entirely dependent on the established organisations to create a niche from which they could operate. In the absence of any niche being readily available because of the partitioning of functions amongst the traditional organisations, the S/TES were reliant on organisations devolving tasks and permitting the S/TES to 'pick them up' as legitimate domains. The traditional services were, on the whole, reluctant to do this because they remained unconvinced of the necessity for another counter-disaster organisation; none of them wanted to see a reduction in their level of involvement, which was how the move was interpreted. It was perceived as having a reduction in influence for the traditional organisations. The consequence of this thinking has been the failure of the traditional, established organisations to offer the S/TES a legitimate placement within the disaster-relevant organisational network.

THE INVOLVEMENT OF THE S/TES IN TWO BUSHFIRE SITUATIONS

The 1981-2 and 1982-3 'fire seasons' were unusually severe in terms of wildfire damage in Australia. Wildfires (or bushfires) have always been a repetitive feature of the Australian environment. The greatest potential risk from this natural hazard type on the Australian continent in terms of property damage and loss of human life exists around the urban fringes of Australia's major cities. Areas surrounding Sydney (the Blue Mountains, in particular), Melbourne (the Dandenong Range), Adelaide and Hobart with their increasing investment in urban development, constitute the nation's greatest fire hazards.

In Tasmania the 1981-2 fire season was to become particularly severe in relation to the State's normal fire seasons. Through most of January and February fires burnt tracts of land, consuming pasture and forest land, private dwellings, public

facilities, stock and other primary resources. A preliminary cost estimate for one period in the fire sequence, that of February 12 to February 17, the most intensive period of the four-to-five week threat, sustained \$5.4 million damage with 129,000 ha burnt out.

Victoria, along with the French Riviera and California, has been described as amongst the world's most fire-prone areas. Bushfires of the sort that were experienced in South Australia and Victoria in 1983 (the 'Ash Wednesday' fires) achieved a level of destruction and threat to human life in a number of localities that in total makes them comparable with such devastating events as tropical cyclones or extensive floods. Between February 16 and February 18, 118 major fires broke out in various parts of Victoria. On February 16 about 93 fires were burning in different parts of the State. In the period February 16-20, some 30 municipalities suffered severely. About 8,000 people were reported to have been made homeless, and 47 people died in fires that were estimated to have caused a financial loss of between \$195-236 million (Oliver, Britton and James, 1984).

In Tasmania, the Tasmania State Emergency Service (TAS SES) was established by an Act of Parliament by the State government in 1976. Under the provisions of the Emergency Services Act 1976 an 'autonomous' Service was created whose responsibility, in the broadest terms, was "for the overall development and maintenance of community preparedness throughout Tasmania". Under provisions laid out in the Act, the Director of TAS SES is also the Director of all the emergency services, a position which permits the incumbent overall control of the establishment and direction of emergency management policy within the entire state. The Director, TAS SES, under the Act, is also the Chairman of the State Disaster Committee, and the Executive Officer of the State Disaster Executive, of which the Police Commissioner is Chairman. The Director has the legal responsibility of producing, disseminating and continually revising the State Disaster Plan, and all regional and municipal plans. Within Tasmania, the directorship of the TAS SES was given to the Commissioner of Police in 1981 when TAS SES was transferred to the Police Department's jurisdiction.

In terms of power, the Police Department is the dominant factor within TAS SES, and indeed, within the entire disaster management network. As Director, the Police Commissioner is instrumental in a number of areas that have direct influence on the running of the Service. With the change of directorship in 1981 to the Police Commissioner, the role of the Deputy-Director was expanded to handle many of the day-to-day administrative concerns of the Service. The Deputy-Directorship, however, is scheduled to be given to a senior police officer, which further consolidates the police hold on the organisation.

The Commissioner/Director has the function of interpreting how the Service will prepare for "the overall development and

maintenance of counter-disaster preparedness", as specified within the Act; because TAS SES is within the jurisdiction of the Police, the Commissioner has the authority to determine how the service will undertake this task.

During the 1982 bushfire threat TAS SES was primarily tasked with the role of information collection and distribution, although this role was never formally placed upon it. It is unclear what role TAS SES saw itself as performing in the early stages of the threat period; it was more unclear what the other DRO's considered its task was. Much of the early tasks of TAS SES appeared to be related to trying to identify an organisational mission and to establish a meaningful placement within the network that would not encroach on existing tasks undertaken by other DROs. This non-specific activity was partially the result of an unclear situation with regard to the extent of the hazard threat, and was accentuated by the organisation not being provided with regular information from lead combat and other support organisations. Eventually, the function of collecting and distributing information was associated with TAS SES, and this function predominated throughout the remainder of the bushfire event.

Communications is a legitimate task for TAS SES. Under the 1976 Act TAS SES has the responsibility for developing a counterdisaster communications system, and within the State Disaster Plan, chairmanship of the Communication Committee is vested within the office of the TAS SES Senior Operations Officer. Compared to its inter-state counterparts, TAS SES has probably the best physical communications facilities. Unfortunately, however, there appears to be some resentment by other organisational personnel over this fact. The effectiveness of the network has been compromised because other organisations were reluctant to utilise TASES equipment, even though TASES officials made it perfectly clear that it was there to be used by any DRO should the need arise. The reluctance of these organisations to legitimise a TAS SES service in this way can be interpreted as the organisations trying to prevent TAS SES from performing an effective part within the emergency management network.

The Tasmania State Emergency Service still suffers from the problems brought about by senior officials in other organisations not fully accepting or understanding the role TAS SES plays. One can still validly ask the question: Does every person in Tasmania DRO network know and understand the functions and the purpose of the State Emergency Service? The short answer is still "no"; not all of them do. Some of those who are aware of the role do not accept the necessity for the organisation to perform within the counter-disaster system. Rather, they would prefer TAS SES did not exist at all. This attitude helps to explain why on the occasion of the bushfires both the domain consensus (that is, the agreement by all involved-organisations that the action undertaken by a specific organisation is appropriate and thus a legitimate disaster task

for the organisation in question) and task competence (implying that the organisation undertaking a specific activity or task is proficient in that task, with other organisations acknowledging the competence of that organisation to perform the task) was lower than anticipated. The lowered domain consensus and its corollary - a lowered boundary specification is illustrated by:

- (1) the lack of information being provided to TASES regional headquarters;
- (2) the lack of requests for the organisation to be used other than as a 'grocery shop' whereby DROs would 'pick up' their orders (i.e. material resources) to augment their own supplies; and
- (3) not employing the coordination capabilities of the organisation or not using their purpose-designed operations rooms during the bushfire threat.

It did appear that in some instances the effectiveness and the efficiency of TAS SES had more to do with the individuals employed, rather than the organisation or its structure; that is, the interpersonal structure rather than the normative structure predominated. This has problems in the long-term, although in the short-run it may achieve the required results. The effectiveness of the organisation may change if personnel changes are introduced, as they must be over time. It should be remembered, however, that it is the 'system' which should be the basis for effective operations, not the actors in spite of the system.

IN VICTORIA, the Victoria State Emergency Service (VIC SES) is a branch of the Ministry of Police and Emergency Services, and operates under the provisions of a government charter which states that the role of VIC SES is "to plan, organise, coordinate and implement measures that are necessary or desirable in respect of the safety of the public and are designed to guard against, prevent, reduce or overcome the effect of emergencies inimical to life, health or property within Victoria". In terms of the State's Disaster Plan (DISPLAN), VIC SES's role is to supplement the combating agencies in their task, relative to natural and other disasters. In case of floods and windstorms, in particular, VIC SES assumes lead responsibility. It is also responsible for assisting municipalities with the establishment and training of LVES. Under DISPLAN the task of integrating the activities of the statutory and voluntary organisations associated with welfare is also the responsibility of VIC SES in conjunction with the Department of Community Welfare Services (DCWS). This responsibility is elaborated in more detail in the DISPLAN sub-plan related to welfare actions (the Disaster Welfare Plan). This Welfare Plan recognises three stages of a disaster event: impact, post-impact, and rehabilitation. Chairmanship of the committee which oversees disaster welfare planning remains with the Director of VIC SES during 'preimpact' states (although these stages do not appear within the frame of reference of the plan), and during the impact stage. Following impact, responsibility for welfare coordination and chairmanship

is transferred to the Dir. General DCWS. The transition of responsibility from one organisation to the other is not elaborated in the plan, nor has it been rehearsed in simulation exercises.

VIC SES suffers within the counter-disaster arrangements by not being able to carry out tasks to completion. Welfare planning commitments stipulate that VIC SES is to be the main activator following disaster intervention. This, however, is usually a time when organisational disruption is probably at its highest. By the time the organisation has become accustomed to its new role within a disaster context, the task which it has activated is suddenly whisked away from it and given to another organisation for completion. VIC SES is left to adapt to a secondary support role, which is largely unspecified in terms of planning arrangements.

Another difficulty encountered by VIC SES in the present structural arrangements is the command structure inherent within the plan. In DISPLAN there are four controlling - or command - systems that become operationalized in an 'Ash Wednesday' magnitude disaster. Each of these four systems influence the operations of VIC SES. In the Ash Wednesday event the controlling networks were the Police Department, which has responsibility of operating the State Disaster HQ; the lead combat authority, which was the Country Fire Authority and the Forests Commission of Victoria, both charged with eliminating the threat agent; the NDO, which has control of resources external to the State; and, in the post-impact phase of the disaster operations, the DCWS was in control of relief and welfare matters. Probably the most significant difficulty encountered by this arrangement for VIC SES was the flow of information from these sources. The effectiveness of the information channels amongst the organisations caused some concern. VIC SES was not formally advised of the bushfire threat, or of the operations being undertaken by the other DROs in the early phases of the situation. It was only the foresight and dedication of senior officers that VIC SES was opened and manned ready for operationalization on the night of February 16. Later in the disaster sequence the failure of the lead combat authority of the Police Department to establish a Media Liaison Officer, as DISPLAN specifies, contributed to VIC SES having difficulty with public donations. Misleading radio station messages to the public urging it to assist with clothing and other resources led to a flood of material being donated. VIC SES, the organisation in charge of welfare matters at the time, had to divert resources away from attending to the needs of immediate victims to tackling the problem of transporting, sorting and storing the donations. Later again, the Director-General of DCWS, after calling a meeting of all welfare organisational personnel, failed to invite the Director of VIC SES. In addition, a large number of requests submitted by VIC SES officers to the Police for NDO assistance were delayed for considerable periods because the police (which is charged under DISPLAN to be the responsible agent for establishing liaison between State and Federal assistance) failed to realize the significance of the requests.

The aftermath of the events of Ash Wednesday may also be significant for VIC SES. Two consequences worth noting in particular are the revision of the State Disaster Plan, and the creation of a Victorian Fire and Emergency Services Board. The special legislation introduced on 22 November 1983, entitled the State Disaster Act 1983, makes provision that the coordination of functions of all government agencies and officers relating to disaster combat are to be the direct responsibility of the Minister for Police and Emergency Services. In periods of declared disaster the Minister assumes the responsibility for the coordination of all DRO's, and is made "Coordinator-in-Chief". In this role he can implement and control all counter-disaster actions and allocate State government resources without reference to the decisions of his senior professional disaster management staff, if he so pleases. In particular, the Minister as Coordinator-in-Chief may take whatever steps he thinks appropriate for the coordination of all welfare measures in and following a state of disaster. He may also convene and preside over any meeting relating to welfare relief. He has the power to delegate any of these responsibilities should he wish. In addition, under this new policy, the Minister is responsible for the formulation of all policy related to the provision of welfare measures following disaster.

In essence, this new legislation reduces the function of VIC SES quite dramatically. It affects this organisation more than it does the DCWS, the other welfare organisation responsible for disaster welfare relief. Because VIC SES activities are determined only within the context of a disaster situation, any reduction in this area will automatically have a consequence in the role VIC SES will ultimately play. The new legislation further reduces VIC SES access to, and involvement within decisionmaking processes and may, as a consequence, result in an alteration of tasks assigned to this organisation in future declared disasters. This problem is exacerbated by the proposals put forward within the Public Service Board's management consultancy team's recommended Victorian Fire and Emergency Services Board.

The effect that the creation of the Board will have on Victorian disaster management procedures has yet to be realised. However, it is assumed that one possibility is that the present VIC SES headquarters will eventually be incorporated into the Fire and Emergency Services Coordination Division, which would be responsible for planning and support, and operations liaison. Under this recommendation the operational structure at the regional and local level of VIC SES activities should remain the same, but decision-making and task assignment at State level (which, it should be pointed out, directs lower-level operations) would be given to another organisation. Retention of organisational autonomy, already a problem for VIC SES, may be further affected. Organisational domain may be readjusted, but how this may be altered is not yet known. There are still some areas of policy adjustment which need to be worked out that may yet work to the advantage of VIC SES.

A NEW TAXONOMY

The seven variables that we looked at which related to organisational effectiveness, and the discovery that these factors were not operating advantageously for the State and Territory Emergency Service organisations, together with the two wildfire case-studies we have presented (we could just as easily have presented tropical cyclones or floods as the natural hazard agent in question and concentrated on other specific S/TES's to illustrate the points made), suggest that the effectiveness of the S/TES within the Australian counter-disaster management system has been compromised. The evidence also suggests that the predicament of the S/TES is a result of influences that stem from within the disaster-relevant organisational network (we are not dismissing the influence that external variables may have - such as the paucity of public understanding of the role S/TES play. These influences, however, are considered to be relatively minor in comparison with the variables we have discussed above). How can we formulate the statements that have been written in a way that illustrates what we believe is occurring?

One perspective which has been found to be most useful for understanding the findings, as has already been spelled out in the introduction, was to focus on how power, in the form of control and influence, was shared amongst the organisations that formed the network. Specifically, the powers of each organisation were considered on the basis of (i) the ability of the organisation to determine the role it would perform within the counter-disaster network, and (ii) the organisation's ability to influence how the network itself would operate. Four types of "organisations" are distinguishable: Cardinal organisations; Conditional organisations; Controlled organisations; and Constrained organisations. The relationship between these different types, and their association with the distribution of power is best illustrated in the form of a diagram:

POTENTIAL TO INFLUENCE DIRECTION OF ORGANISATIONAL NETWORK

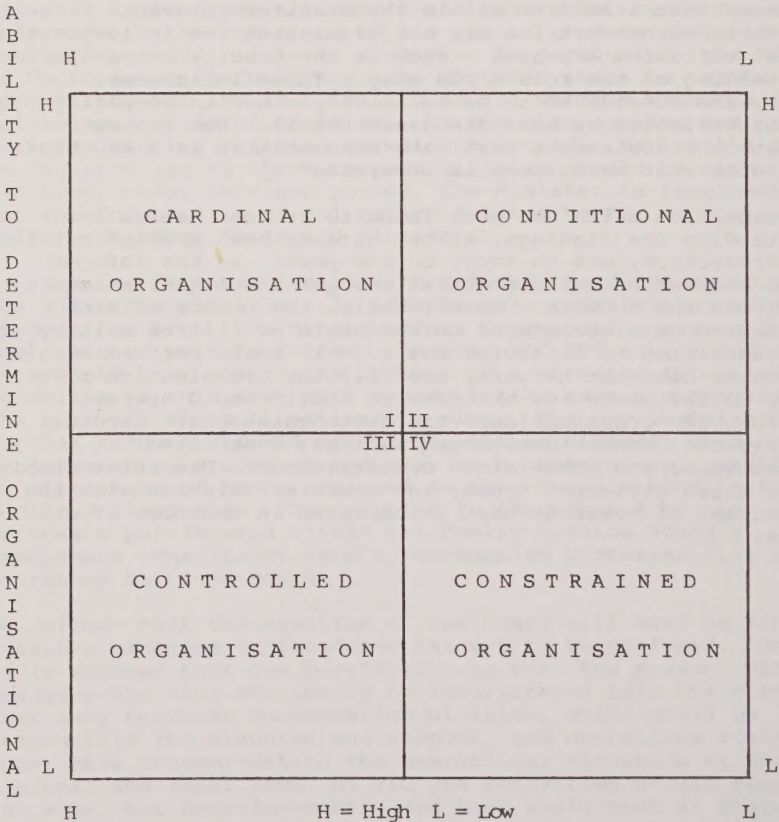


Figure 4: ORGANISATIONAL TYPES WITHIN THE AUSTRALIAN COUNTER-DISASTER NETWORK

By far the most powerful organisational type within the counter-disaster network are those organisations which have the capabilities for their senior officials to determine the role that the organisation will perform during all aspects of the organisation's functions, including a disaster situation. This capacity is achieved either through the acquisition of power and authority bestowed on the organisation by specific legislation; or by the role they perform within the social structure as it relates to emergency management, which is transferred through the process of legitimation to the disaster situation; or because they have skills and material resources appropriate to the amelioration of the threat situation. These organisations also have the power, either by virtue of legislation or their standing within the network, to influence the direction that the network will take. Such organisations are called Cardinal organisations because of their central position within the network and the centralization of power they can muster within the net. The tasks these organisations perform are commensurate with the societal value of preserving or saving life and property.

The group of organisations that has a relatively high degree of determinability to specify the role which it will undertake, yet does not have as much influence within the organisational network, has been labelled Conditional organisations. These organisations are usually autonomous during non-emergency circumstances. Contained within this group are those organisations which have specific skills or resources (or legal bases) that more-or-less predetermine their functions within the counterdisaster structure. However, they do not possess a continual or a significant degree of influence within the organisational network to determine the direction of the entire network. They may, under certain circumstances, be capable of determining the roles performed by some organisations whose functions are similar to their own in an emergency period. Legitimacy and functional performance is conditional upon the acceptance of these specific organisations by the controlling Cardinal organisations, through which it gets approval from the majority of organisations within the overall network. Although the tasks these organisations perform are essential, they are secondary to the tasks performed by cardinal organisations. In Figure 2 these organisations are located within the ERO category, rather than the DRO group.

A further organisational type is characterised by its ability to influence the direction of the organisational network, and to dictate its own role within the counter-disaster organisational framework. However, this organisational type is restrained from doing so by legislation and political considerations. They are high-status organisations but keep a low profile during a disaster event unless called upon by the cardinal organisations or the organisations charged with liaising with external organisations. These organisations can

influence the organisational network in a forthright manner through their control of resources that may be required in disaster situation, and also indirectly by having control over resources that are made available to some network organisations during non-operational periods. These are called Controlled organisations.

Their task is primarily to act as a support net for the Cardinal organisations.

The last type of organisation usually appears to be 'younger' than the more established organisations discussed above. Whereas the other types of organisations have quite a long 'track record' of involvement within emergency management and counter-disaster operations, Constrained organisations are relative newcomers. Consequently, their role within the network is less rigidly defined, and the organisation's functions are not as entrenched as some of the other types can be. The role of this organisation is more-or-less determined externally, by members of the organisational network, either in a direct manner or indirectly; in some cases both approaches may be used. Its placement within the network is determined in varying degrees by its organisational set rather than characteristics of the organisation itself or the personnel within it. The task of this organisation is very similar to that of the Cardinal organisations and Conditional organisations during disaster, at least in terms of official documentation.

It is also possible to regard these organisational types as having different positions along a continuum of "power potency". The continuum is related to whether the organisational network has control over the organisation (indicating little power potency), or whether the organisation has control over the network (suggesting great power potency).

CONTINUUM OF POWER WITHIN THE COUNTER-DISASTER ORGANISATIONAL NETWORK

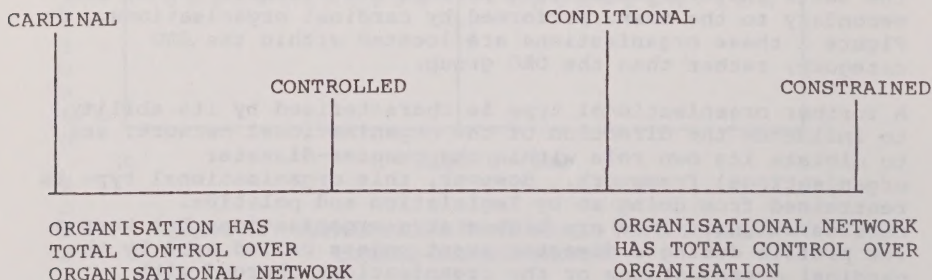


FIGURE 5

As Figure 5 suggests, at the highest level is the Cardinal organisation because it has the greatest real and potential power to control the orientation of the entire disaster management network. It has more power vested in it than the other organisational types. The next organisation in terms of power is the Controlled organisation. It has a significant amount of potential power, yet does not wield it all at any one time during civil crisis periods. It can nevertheless exert significant influence on the organisations within the network both directly and indirectly. The next level of organisational power is the Conditional organisation. They do not usually wield a significant amount of power within the disaster situation in terms of network influence, but they may be powerful within areas that are designated as being in their jurisdiction. The final organisation with the least amount of power potential and with the least possibility of influencing the network is the Constrained organisation. It does not appear capable of exerting much control over the network decision-makers.

In terms of specific organisations, we suggest that the Police Department, the lead combat authorities and the State/Territory Disaster Committees are examples of Cardinal organisations. Senior officials within this central organisational type form the 'dominant coalition' within the disaster management network. The dominant coalition may be expanded at times to include representatives of Conditional organisations with the onset of post-impact operations. In this group of organisations, government welfare or social security departments, voluntary agencies (that is, most of the support organisations), and other combat authorities would be placed. Examples of a Controlled organisation would be the Natural Disasters Organisation (NDO) and its parent organisation, the federal Department of Defence. The State and Territory Emergency Service (S/TES) would be the example provided for the Constrained organisation.

POTENTIAL TO INFLUENCE DIRECTION OF ORGANISATIONAL NETWORK

A B I L I T Y T O D E T E R M I N E O R G A N I S A T I O N A L R O L E	H	H		L			
		H		H			
	L	H		L			
		H		L			
				CARDINAL ORGANISATION		CONDITIONAL ORGANISATION	
				-Police Departments -(s/t) Disaster committees -Lead Combat Authorities		- Other Combat Authorities - Voluntary Agencies - Govt. Welfare Dept's	
				1		2	
				CONTROLLED ORGANISATION		CONSTRAINED ORGANISATION	
		- Natural Disaster Orgn. - Federal Dept. Defence		- State & Territory Emergency Service organisations			
L	H		L				

FIGURE 6: EXAMPLES AND TYPES OF ORGANISATIONS WITHIN THE AUSTRALIAN COUNTER-DISASTER NETWORK

CONCLUDING REMARKS

The basic findings presented in this paper suggest that the State and Territory Emergency Service organisations do have a number of constraints placed upon them; and that these constraints are imposed by factors external to the organisation, but internal to the network. Restrictions placed on the

functions of this organisation during operationalisation appear to be a deliberate attempt by traditional disaster-relevant organisations (DRO's) to exclude the S/TES from actively engaging in the full potential it can offer within the counter-disaster organisational network. In particular, the dominant organisations within the network seem to employ two types of method to reduce the involvement of the S/TES, which have serious repercussions on the effectiveness of that organisation.

In the first category, formal constraining methods are used to control the functions of the organisation. These are manifested by devices such as;

- having the position of Director placed within the role-set of a senior incumbent in another counter-disaster organisation; or
- having organisational policy determined by officials outside the organisation; or
- by defining the roles of the organisations on the basis of nebulous legislation that is open to wide interpretation and possible manipulation by officials who have the capabilities to influence the organisation in question.

Formalized prescriptions such as those found within the Acts of Parliament and the various State Disaster Plans determine the parameters that the S/TES must work within. These boundary specifications, however, have a certain degree of flexibility contained within them. It is the second category of limiting devices employed by the traditional DROs that further reduces the choices available to the S/TES. These are the informal methods.

Informal methods can be more constraining than formal prescriptions. It is the application of informal practices that determine the amount of flexibility available within the official boundary specifications. Informal mechanisms that restrict the performance of the S/TES are:

- delaying to inform the S/TES officials that the network has become operationalized;
- refusal to share information that is essential for continual and effective participation;
- negative attitudes that question the effectiveness and the role of the organisation; and
- not attempting to be cognizant of the roles the organisation plays within the disaster context.

All of these have been employed at some stage by DROs within the Australian counter-disaster organisational network in their relation to the S/TES. Unfortunately, it is not only the S/TES that suffers. The effectiveness of the entire counter-disaster network must also be reduced by these practices.

REFERENCES

- Anderson, W.A. (1972) DRC studies of organisational change. In , Proceedings of organizational and community response to disaster; Japan-United States Disaster Research Seminar. 11-15 September, 1972. Ohio State University, Columbus, Ohio. pp74-89.
- Barton, A.H. (1969) Communities in disasters: A sociological analysis of collective stress situations. Doubleday & Co. Garden City, New York.
- Britton, N.R. (1982) Darwin's Cyclone Max: An exploratory Survey of a natural hazard sequence on the development of a disaster sub- culture. Disaster Investigation Report No. 4, Centre for Disaster Studies, James Cook University of North Queensland, Townsville.
- Britton, N.R. (1983a) Needed: A rescue operation for an International Rescue organisation - a reply to Michaelis. Impact of Science on Society, 1983, 2, 231-236.
- Britton, N.R. (1983b) The bushfires in Tasmania. February 1982: How the disaster-relevant organizations responded. Disaster Investigation Report No. 6, Centre for Disaster Studies. James Cook University of North Queensland, Townsville.
- Britton, N.R. (1984a) Australia's organised response to natural disaster. Part I: Background and theory. Disasters (forthcoming).
- Britton, N.R. (1984b) Australia's organised response to natural disaster. Part II: The constrained organisation in two wildfire settings. Disasters (forthcoming).
- Dunn, R. (1983) Counter-disaster preparedness in Australia. Legislative Research Service. Department of the Parliamentary Library. Basic paper No. 8.
- Dynes, R.R.(1970) Organized behavior in disaster. D.C. Heath and Co. Lexington.
- Etzioni, A. (1964) Modern Organizations. Prentice-Hall, Englewood Cliffs, New Jersey.
- Oliver, J., Britton, N.R. and James, M.K. (1984) The Ash Wednesday Bushfires in Victoria. 16th February, 1983. Disaster Investigation Report No. 7. Centre for Disaster Studies. James Cook University of North Queensland, Townsville.
- Thompson, J O. (1967). Organizations in Action. McGraw-Hill, New York.

Wenger, D.E. (1978) Community response to disaster: Functional and structural alterations. In Quarentelli, E.L. (Ed.) Disasters: Theory and Research. Sage series on international sociology No. 14. Beverly Hills, California pp 17-49.

Wettenhall, R.L. (1980) The response of government to disaster: A study in fragmentation. In Oliver, J. (Ed.) Response to disaster Centre for Disaster Studies, James Cook University of North Queensland, Townsville.

INSURANCE RESPONSE IN DISASTER

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A disaster occurs when there is widespread disruption of social processes, coupled with the destruction of the functional infrastructure to the extent that ongoing routines can no longer be supported or maintained.

A disaster is a public affair. It is a destructive agent that affects all people within a spatially defined area. The difference between a disaster and a non-disaster is that under conditions of disasters, social organisation in some way becomes disrupted. The disruption of social organisation, however is dependent on the context within which that disruption is produced; it is also dependent on the social setting in which the disaster is seen to occur. Massive damage to property and high casualty rates and a high degree of disruption on a battlefield, for example, is not considered a disaster, although the criteria with which we justified the distinction between accident, emergency and disaster has been fulfilled within a battle situation. However, the general consensus regarding wins and losses during times of armed conflict accept these consequences and conditions of warfare. A military 'disaster', to carry on with this analogy, occurs under special circumstances, such as when the social organisation of the armed forces breaks down or does not operate in an efficient or integrated manner. It is also conceivable, albeit an inaccuracy, that a military 'disaster' could occur if your side loses the confrontation. However, as has been pointed out already, the personalisation of unpleasant events is not a correct application of the word disaster.

One of the ways in which people seek to minimise the effects of disasters is by taking adequate avoidance and evasive action so as to prevent the disaster affecting the individual or by ensuring that its effects are minimised. Insurance is one such method of ensuring the minimisation of such events. In a study of 'insuring man' (Britton, Kearney, Britton, 1983) it was shown that there were many factors which were relevant to a person's orientation to preventative action through the medium of insurance. They identified 32 variables which had been distilled from 160 abstracts that had been found to be relevant in the decision to purchase insurance. These variables were used to suggest a formula which may predict insuring behaviour:

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$$P_I = (S_N + I_R + A_A + P_N + I_F)$$

'whereby the probability of insuring against the consequence of a natural hazard event (P_I) is a function of the objective knowledge of the natural hazard problem, that is salience (S_N), plus information which is relevant to the phenomenon under consideration (I_R), plus the accuracy of the awareness of natural hazards (A_A) - that is experience, together with the probability of adopting hazard mitigating devices (P_A) and the actions of insurance companies (I_F)'

(Britton, Kearney, Britton, 1983:325)

We will return to consider the question of human behavioural response to disaster insurance in a later section of this paper. Before attempting this, we will focus our attention on two questions which are of great importance to us when looking at disaster. The first question is 'Why is it popularly believed that people behave so badly during times of disaster?' The second question asks 'Why do people repeat their mistakes by relocating themselves in the same high-risk areas in which they were previously - and in a lot of cases, knowingly - vulnerable?'

A SENSE OF PLACE

Both of these questions are of great importance to us if we are to understand the way that man will behave in relation to his interaction with his environment. Models of human behaviour argue that man has a hierarchy of human needs as outlined by Abraham Maslow. Maslow (1954) points out that the need for security and shelter are important needs for human beings and once the most elementary needs of hunger and thirst have been satisfied there will be motivation to secure adequate security and shelter so that higher order needs can be met. The erection of shelter, the establishment of permanently secure places, such as in caves, in defensible positions are the first stage that man has taken to mark and to possess a territory. This territory satisfied only the needs of the security, but takes on a special emotional significance. A person will go to great lengths to identify with, and to physically and psychologically protect, this territory. This is despite contradictory environmental evidence that a specific location may not provide physical security. Simpson-Housley (1976) in his thesis related to the perception of natural hazards in Newlands (Wellington) and Reefton in the South Island of New Zealand, suggested that topophilia - 'a love of places' - (Yi-Fu Tuan, 1974) provided an explanation for the strong identification residents had with their location despite the presence of a hazard threat (earthquake) which could endanger both their private life and property.

Even nomadic tribes tend to move from one secure position to another secure position. Biernoff (1978) suggests the nomadic Aboriginal Australian has safe pathways through his territory and he will not transgress into dangerous places. Man, like other animals, will go to great lengths to defend and protect his territory, and classify his physical and psychological environment into safe and dangerous places. It has been suggested that modern warfare has been concerned about the taking and holding of territory and its defence. Virtually all modern warfare from the Crusades on has been concerned with the holding and acquisition of territory. This seemingly persistent attempt to protect property from external agents has been more evident in the context of defence against marauders and other armed forces. The propensity to protect one's property has not been so evident - nor as successful - if one considers the actions taken to protect against an even greater potential enemy - Nature. It is interesting to note, when considering a relationship between warfare and natural hazard protection, that the counter-disaster organisation in this part of the world - indeed throughout the western world - had their origins in the armed forces, particularly the civil defence movement. It is only recently that Australia deliberately and consciously moved away from the nuclear warfare civil defence frame of mind towards an orientation on counter disaster. In New Zealand, whilst this trend is also following similar lines, the civil defence concept has been replaced less rapidly, in name, if not in function (Britton, forthcoming).

If territory is so important then it is logical to assume that man will take extreme measures to defend that territory. Whilst not engaged in warfare and other activities, he is at relative peace and liberty to pursue and fulfill his goals. These goals will be concerned with the utilisation of that territory and that space, and they become part of his person. In an illuminating study of aboriginal territoriality, Hamilton (1972) demonstrated that it was permissible for people living in aboriginal communities to make offensive and provocative comments to their neighbours provided they stayed within a defined proximity to their own shelter. This proximity was demarcated by an imaginary boundary. However, once this boundary had been crossed the same comments or statements would automatically and inevitably place the speaker at great risk because he would then be placed in an aggressive relationship with his neighbours and they would throw spears or stones or other implements at him to indicate that the security of his territory had been broken and he was now vulnerable.

There are many examples of the way in which people will protect and defend territory. A seemingly irrational holding on to an area of land has been recorded through the ages. It is probably more sharply observed when there are conditions of stress. For example, submariners occupy a very restricted space and feel more stressed when anybody invades their own personal territory. Similar conditions have been observed of people in lifeboats and on life rafts. The possession of individual space and territory is most important when there are a lot of other people present or

where there has been some uncertainty of what the territory may be. The easiest way to stop invasion of a territory or space is to establish markers or boundaries which signal to other individuals that this area is reserved or already occupied. The animal kingdom has a large number of such mechanisms for demarcating territory. In human space we find this most evident where people place objects or other boundary markers around a space they wish to occupy. It is by the personalisation of space, by photographs, by some individual marker, or some other physical item, which will demarcate that space. Even by the great experiment in open plan architecture we have found that people generated all types of reasons why they needed individual space. They argued they need the space so they can discipline junior staff, to conduct confidential interviews with clients, to conduct personal interviews with colleagues and so on. The occupants of an open-floor plan space will demonstrate great enthusiasm that an individual has to establish potted plants, glass screens, photographs and every other type of item which will demarcate that space for him.

Because people are so committed to the individualisation of space it is perhaps not surprising that people will go to greater lengths to occupy that territory under conditions of stress, particularly when a disaster strikes. It is under conditions of uncertainty and ambiguity that there will be most pressure to occupy that territory. In fact, it has been established by research that has focused on aspects of human behaviour in disaster that one effect of disaster is that people actually converge onto the impact site. The reasons why they do so are quite rational. They will very likely go to the scene either through curiosity, concern about kin and friends, or to render assistance if they can. Once there, they seek ways to help and if a helping role can be assumed they often exhibit altruistic behaviour that, upon retrospect, even they may find surprising (Fritz & Mathewson, 1957).

HUMAN RESPONSE TO THE UNEXPECTED EVENT

If we turn our attention to address the first question - why does a belief exist that suggests people behave badly in a disaster we must attempt to answer two further questions, namely: How important are beliefs, belief systems, and social definitions relating to disaster and disaster behaviour; and, do people in fact behave badly in a disaster.

BELIEFS AND BELIEF SYSTEMS

Beliefs are imbedded in all sociocultural systems. Beliefs that concern the relationship between human behaviour and natural forces appear to be critically important for an understanding of social response to natural disaster. In a 1979 paper, William Torry, an American anthropologist, suggested that the conception, dissemination and adoptive significance of a culture's folk beliefs and the political and religious dogma prevalent within

the social system of the society under consideration deserve considerably more attention by hazard researchers than they had thusfar received. According to Torry (1979), there is much to suggest that the cognitive dimension enshrined in beliefs about hazards exercise considerable influence over the coping mechanisms of people.

The study of beliefs and mythologies that have grown up around disasters is as sociologically relevant as the disaster event itself. Wenger (1978) refers to a twofold division of belief systems in the context of natural disasters. The first category describes belief systems that are based on unicausal, passive, and deified perspectives. Within these cultures, disasters may be viewed as acts of god. Human beings within this system are likely to be viewed as passive actors in relation to the dynamic forces of nature, incapable of direct intervention, but forced to adapt to the vagaries of the natural forces. This is a fatalistic conception. Supplication, prayer and passive acceptance of one's fate are likely to be acceptable mechanisms for response to disaster. Submission and acceptance of one's fate are appropriate patterns of behaviour.

The second category of beliefs Wenger refers to suggests that complex, activistic, naturalistic causes will prevail. Blame can be apportioned to the natural forces but at the same time the prevailing attitude is one of manipulating and moulding the natural environment to reduce the effects of the disaster event on human settlements. This may also lead to 'blame' and 'scape-goating' (Bucher, 1957; Drabek and Quarantelli, 1967; Fritz and Williams, 1957), particularly where human actions appear to be involved for example in 'technological' or man-made disasters.

Denial, withdrawal and projection are other psychological techniques which are used to allow a person to structure consistency on inconsistent events and beliefs.

Belief systems can influence the attitude of people towards the causes and consequences of a disaster, and can also direct their involvement in preparing for, and mitigating against, extreme environmental intervention.

BEHAVIOUR IN DISASTER

Quarantelli (1979) has consistently argued that people do not behave badly at times of disaster. Quarantelli has argued in fact that the antisocial behaviour that is reported at times of disaster is generated by reporters who find more mileage from this type of reporting, than a story indicating that the community cooperated well together and that a great deal of sharing and cooperation in an area was the norm. He states that on numerous occasions in which he has visited sites he has found no relationship between the newspaper reports of what happens and his own observations. A similar situation was recorded in Tasmania during the bushfires of February 1982 (Britton, 1983).

Quarantelli is singularly scathing of the antisocial model. He goes so far as to argue that during this period there is exemplary prosocial behaviour by communities.

It has been found time and time again that in periods of stress people can endure much more hardship, deprivation, undernourishment and shock than they ever thought possible. If there is one generalisation that does apply to the behaviour of most people in disaster, it is that although they experience shock, fear and feelings of inadequacy, they tend to behave in a reasonably rational manner and to handle the immediate problem with good sense and responsibility.

On a broad level, a natural disaster impact alters the nature and quantity of 'inputs' to a social system, thereby producing changes in the nature of the 'demands' made upon the constituent elements of the system (Britton, 1980:14). The 'demand-adaption model' (Barton, 1969) has been widely used in studies of natural disaster and appears to be effective whether the focal system elements are individuals, families, established organisations, emergent organisations, communities, or total societies. This perspective does not equate natural disaster with stress, but suggests that natural disasters cause changes in the social system which, in turn require system elements to adapt to different demands. In this context, stress can be understood in terms of the exchanges which occur between the altered social system and its adjusting components. This also introduces a time factor as a further variable in the equation necessary to understand behaviour in a disaster situation. What makes time a factor in postdisaster individual behaviour, and probably accounts for the variability of 'stages' of disaster reaction, is the social availability of, and the psychological capacity for restructuring activity. Apart from creating individual disorientation and disruption, a disaster also disrupts the existing social processes, routines, and networks that have been established, and internalised by societal members as being available in time of need. In a situation of system overload - which is how a disaster could be described the established social support networks are likely to break down because of the disruption to facilities, role incumbents, and communication facilities, thus causing the efficiency of these support systems to be less than optimally effective (Britton, 1980:16).

Adding the disruption of the societal support networks to the already disrupted individual within the impact area, who has to try and regain an equilibrium state in a new, unfamiliar, and probably terrifying social environment, individual upheaval is exacerbated. The impairment of self, place and social support systems combined, in some cases, to overburden the individual to a non-coping position. Wilson (1962:131), however, states that

this is not a universal concomitant: there is some evidence that disaster experience constitutes for some people an 'optimal stress' which promotes active mental harmony rather than creates a psychiatric disorder.

THE INDIVIDUAL AND THE DEFINITION OF THE SITUATION

Disaster studies based on social science findings suggest that persons live in a dynamic or active equilibrium with their environment, both in physical and social-psychological contexts.

The specific boundaries of each person-environment equilibrium are defined by individual development and experience, by social custom, and by a sustaining network of living relationships. Within this system there is a balance between security and novelty. Too much of the same produces dullness and boredom, causing persons to seek out novelty and new sources of stimulation. Too rapid a discrepant departure from the familiar arouses fear and anxiety which motivates defensive reactions, including a rigid return to early and well-established behavioural patterns, and may also create confusion to the point of being unable to cope or operate effectively. Disasters are, of course, extreme departures from the familiar. It is their extremity which accounts, in part, for the psychological stress they arouse, as well as for reactions in which persons exacerbate the situation, and/or distort reality as they attempt to assimilate the novel or unknown to familiar and well-established patterns (Britton, 1980:18). Stress is also aroused by the obviously threatening nature of the disaster injury, potential loss of life, harm or loss of significant others, destruction of property, destruction, or impairment of psychological investment, and the like. These sources of threat also arouse anxiety and produce defensive reactions of various types.

One important perspective to understanding individual reaction to disaster is to try to understand what the individual is reacting to: that is, how does the individual perceive the disaster event, and what does it mean to him? This orientation leads the researcher to develop an understanding of the individual vis-a-vis the disaster event as it relates to the individual's past experiences, his purpose, and his experientially-based estimate of his own capacities to act effectively.

The personal and collective definitions of a disaster strongly influence the response to it by the victims as well as by outsiders. The attribution of causality and responsibility which defines the disasters as externally caused, rather than the fault of the impact-victims generally leads to a positive coping effort, and to positive welfare-giving and therapeutic responses from others. The personal reactions are generally constructive, and only temporarily disorganised (Britton, 1979).

It is not clear exactly what processes are involved in sustaining and dealing with stress, in 'coping', 'surviving' or 'getting over it', nor what are the mental sequels (Kinston and Rosser, 1974:451-2). What is threatening to a particular person which may cause psychological disruption depends on the amount of psychic pain, and the amount of painful effect that the individual can withstand at the moment he is subjected to the threatening situation. The intensity and quality and psychosocial reactions to disaster vary with the individual personality structure, his past experience with disaster, the degree of physical damage to significant persons and property, and his opportunity to define the situation in a way with which he can cope. If a person interprets a disaster situation as one in which he can overcome, 'ride out' or be useful in, the probability seems that he will suffer little, if any, psychosocial impairment. This orientation is furthered if the individual has had previous experience in life-threatening situations, or if he has prior training or insight into the likely consequences. He is thus better equipped to withstand the trauma of the disaster. If, on the other hand, the individual interprets the situation as being one out of his hands, that there is nothing he can do to mitigate the changed social environment, that the situation is defined as one in which nothing but futility, destruction, and doom is present, psychological impairment may be heightened and/or prolonged (Britton, 1980:19).

RULE DIRECTED BEHAVIOUR

Human behaviour is organised by rules which regulate the social intercourse between participants. These rules are learnt as part of the socialisation process of individuals within a society. The rules are part of cultural learning which is 'the sum total of behavioural patterns, attitudes and values, shares and transmitted by the members of a given society' (Linton, 1936).

The rules which direct behaviour must be -

- a. relatively simple;
- b. easy to understand;
- c. obvious to participants;
- d. reinforced by members of the society.

The rules of behaviour cover both simple and complex situations. They are highly structured but flexible enough to allow participants to interact to new and novel contexts. Appropriate and permissible responses are prescribed in everyday situations such as turntaking, speaking sequences, introductions, and telephone manners, etc. More complex behaviours such as funeral rites, parliamentary procedure, marriage arrangements, crowding and queueing, are equally precisely prescribed.

Even in rare and sometimes dangerous situations legitimate and approved behaviours are available for the guidance of participants on occasions such as the order of departure from the

sinking ship, fire drill, and traffic accidents.

When the rules become inoperable for some reason then another set of rules must be borrowed or developed, or the situation must be restructured to allow those rules to apply.

'Humans are the valuator, who in the very act of valuating are engaged in moulding their world, making themselves adequate to the environment and their environment adequate to themselves'. (Rollo May, 1982:21)

In a prisoner of war camp the survival of the inmates demands the establishment of an informal set of rules to determine the relationships, not only of the guards and prisoners, but also the relationship between prisoners themselves. Arneil (1983) demonstrates the importance of such rules.

Rules do break down on occasions in situations such as -

- a. overcrowding
- b. inconsistent treatment
- c. brutalisation
- d. isolation
- e. solitary confinement
- f. sensory deprivation
- g. continual lack of privacy.

However, it is not inevitable that behaviour does become unregulated and non-rule directed.

Under conditions of overcrowding there has been some evidence of antisocial behaviour, such as with the lemmings who ritually commit suicide by running headlong into the sea. Other destructive patterns have been observed which are called a 'behavioural sink'. However, man is able to live under conditions of great overcrowding by the manipulation mechanisms of social and physical distance.

The problem of finding rules under conditions of inconsistency does lead to neurotic and inconsistent behaviour. The famous McGill University studies of Hebb (1949) demonstrated that dogs which had been inconsistently handled had more psychological problems than dogs which had been harshly treated. Inconsistency is essentially the lack of any discernible rule.

When Festinger, Riecken and Schachter (1956) joined with a movement who believe the world would end on 21 December 1954 they were able to demonstrate that the failure of the Apocalypse to

occur did not interfere with the beliefs of many of those who survived the 'fateful' December day. Disconfirmed expectancies therefore do not necessarily destroy beliefs. Man develops systems to incorporate cognitive dissonance between firmly held beliefs and behaviour.

The effect of brutalisation on individuals has been shown to seriously interfere with their stability and psychological well being but there has been evidence that those with a sufficiently strong sense of values and prescribed rules can survive brutal treatment. Bettelheim (1960) himself an inmate of Dachau and Buchenwald, demonstrated his ability to withstand torture, punishment and cruelty. In general, isolation, solitary confinement, and sensory deprivation are seen as the most debilitating influence (Altman & Haythorn, 1967). There have been reported cases of Japanese soldiers still fiercely loyal to their Emperor being found hiding from capture in the Philippines as late as 1973 some 27 years after the cessation of hostilities, during which time isolated soldiers remained in hiding unaware that the war had ended. It is not the intention to minimise the almost inevitable social and psychologically degenerative effects of social isolation and sensory deprivation, but to demonstrate that there are degrees of protection afforded if a person can determine a set of rules and operate by them.

In general we find high consistency of behaviour from time to time and for situation to situation. Occasionally traumatic events will interfere with this consistency. An early example of this is found in the description of Pavlov's (1941) research when in 1924 the river Neva flooded Leningrad and entered Pavlov's laboratories. It appeared that the dogs who had been used in conditioned learning experiments would be drowned. The actions of a courageous laboratory attendant in swimming into the basement laboratory and rescuing the dogs resulted in saving them. However, Pavlov soon found that some dogs had completely forgotten all their previous learning and took months to re-establish the conditioning which had already taken place. It was as though all previous learning had been completely obliterated.

Biochemical effects such as the blood sugar level, the use of drugs/alcohol, the use of neurotoxins, car emissions, food additives and colour agents, all affect behaviour but this is the receptor phase rather than the rule-determining phase. Whilst rules remain available to individuals, human behaviour remains very robust and resilient to changes in external conditions.

It has been argued by Kearney and Reser (1980) and Kearney (1981) that under conditions of great stress and uncertainty there is a powerful and pervasive drive on the part of people in a community to reduce and minimise the uncertainty and ambiguity in which they are placed. There are several ways of re-establishing rule-directed behaviour which allows a society to function., This process of reducing uncertainty is described as a period in

which norms, roles and social obligations and the rules which govern them are temporarily suspended. Once the roles of an individual in society are in abeyance the very essence of the social fabric has been placed at risk and members are placed in jeopardy. We can only exist in society when we occupy roles and positions. These roles and positions are supported by the holding of attitudes, beliefs and values. Sometimes these attitudes, beliefs and values become stereotypes or even prejudice but nevertheless they do provide an important adjustive economy for individuals which facilitates and allows social interaction. It is an impossible psychological strain for an individual to simply not have the available roles, norms and values on which to refer. In Kearney (1981) it is argued that it is essential for any community where the normative behaviour patterns have been disrupted to have these re-established as quickly as possible. It is further argued that these important stabilising and socialising norms, roles and values can only be established by the community itself, they cannot be established by outsiders imposing that sense of community on a group of people. The community must 'heal itself' or become the 'therapeutic country' (Fritz, 1961). Chamberlain, Hartshorn, Mugglestone, Short, Svensson and Western (1981) in reporting on the Brisbane floods of 1974 note -

'What is quite apparent from this part of the study is that, in time of disaster, people turn for preference to people they know well and only when more personal resources are lacking do they seek help from public sources.' (Chamberlain et al, 1981:221)

In this aspect the psychiatric medicine is sharply different from physical medicine.

One great lesson that was learned in Vietnam was that a person who is injured should be removed as far as possible from the scene of battle and taken immediately to the best possible medical attention. The normal line in the military forces may include a first-aid post, a casualty-clearing station, an advanced dressing station, a field general hospital, and a base hospital was circumvented so that medical evacuation took place by helicopter. Injured soldiers were taken directly to a base general hospital and all the intermediate stages were eliminated. Thus a battle casualty received the very best possible medical attention in the very shortest time. It is, however, the case under the conditions of stress reactions that it has been observed on many occasions that the further a soldier is removed from the front line, the less likely he is to be able to return to the front line fit for service. McBride (1979) said

'As soon as soldiers started showing the typical signs of diarrhoea, headaches, nightmares, trembling, sweating and the fear symptoms, they were taken out of action and

sent home for hospitalisation. When this happened they never returned to the front line again and this is the real tragedy, they also tended not to get better.'

(McBride 1979:72)

Effective psychiatric emergency care is best carried out at near as possible to the place where the casualty occurred and preferably by people involved in the same experiences. Quite often this will not be a member of the helping profession, but may be another significant person such as the man's commanding officer, company commander, the local padre, friend or any other individual to whom he is close. A period of rest, a cup of coffee, a little discussion, may alleviate the traumas of fatigue and stress that could otherwise in the long run cause a person's hospitalisation and subsequent lack of rehabilitation. Communities who have been devastated by a disaster are much the same. They have been placed under conditions of great stress and great uncertainty. In order for them to re-establish their roles and the positions, it is essential that they do so with a minimum of interference from outside members. Whilst there will always be a great response to a large disaster and many willing workers wish to move into an area to offer assistance, it is sometimes the case that helpers of this type are more hindrance than of benefit to the community. This outcome has been described by Fritz (1961) as the 'cornucopia effect'. Communities may reject the outside helpers and drive them away from the area. They may be described as being ghoulish, tourists, 'do-gooders', 'grandstanders' or in some other such negative term. This is because, although such people are of potential benefit to the society, they cannot participate in the task role, value and norm reconstruction. Not only can they not participate but they hinder the re-establishment of the sense of community and their very presence interferes with the re-establishment of the community. This is not to say that such helpers are not potentially valuable. To be effective their role has to be carefully monitored and they must limit themselves to doing only those essential tasks which are providing a particular type of service (Britton, 1980). Quite often they are better being resource people to members of the community who are re-establishing themselves rather than taking over that role. Certain types of roles lend themselves more easily to the help of outsiders, for example the re-establishment of a secure water supply or sanitation systems or perhaps the provision of emergency surgical and resuscitation teams in an area. However the leadership, organisational and other important social roles should remain within the local community wherever this is possible. If this is done it is suspected that the long-term psychological effects of disaster will be minimised. The National Health and Medical Research Council (1982) report -

'Optimal adjustment is facilitated by an individual's active involvement in rebuilding his own life and the life of his community.'

(NHRMC 1981, 1982)

The effects of Cyclone Tracy on Darwin in 1974 were the most devastating experience of a disaster in Australia. This event resulted in the largest mass evacuation of a community in the history of Australia and one of the largest evacuations in the western world. In all some 23,000 people were evacuated from Darwin over ten-days following 25 December 1974. Many people who were evacuated did not wish to leave Darwin but it was an assessment at that time that there had been a complete breakdown in the water supply, communications and power supply and that it was not possible to maintain the population as it was prior to the disaster without there being a serious health risk to the total community. It must be remembered that Darwin was in the middle of the monsoonal 'wet' season, with temperatures constantly in the 30's and extremely high humidity. It was envisaged that had a serious health risk developed, it would have been almost impossible to provide adequate medical assistance because the nearest large town is 2500 kilometres away. Evacuation was undoubtedly the correct decision at the time. Major General Alan Stretton (1976,1978) indicates the dilemma in which he was placed. Although there has been criticism of the decision to evacuate, there can be no doubt that it was the best decision under the circumstances. However, this is not to say that there is not a heavy cost to be borne by the evacuation. Milne (1977a, 1977b), Western, and Milne (1976) and Chamberlain, Doube, Milne, Rolls and Western (1981) have written about the effects of the decision to evacuate. In Table 1, Milne (1977a) shows response patterns before and after the disaster.

TABLE 1: Response to Before and Now Disaster Checklist Items:
Sum of Weighted Difference Expressed as Percentages
of Each Group

	STAYERS	RETURNED EVACUEES	NON-RETURNED EVACUEES
Maladaptation			
A restless person	19.1	28.3	57.9
Worried about the future	35.9	50.0	84.7
Nervous and depressed	25.0	36.5	55.3
Lacking in confidence	2.2	1.9	31.9
Short tempered	16.9	17.0	35.0
Addictiveness			
A smoker	4.5	5.7	7.4
Fond of alcoholic beverages	3.4	4.8	7.5

Taking pain killing drugs	5.6	0.0	10.2
Psychosomatic disturbance			
Prone to headaches	7.9	13.5	23.3
Troubled by a skin complaint	1.1	3.8	11.2
Lacking in energy	18.4	7.8	36.0
Without appetite for food	- 1.0	6.6	4.6
Troubled by indigestion	11.4	0.9	8.4
Overweight	5.7	6.6	15.0
Asthmatic	0.0	1.9	2.3
Having bowel trouble	6.7	-0.9	6.5
Underweight	1.1	4.7	2.8
Family stress			
Finding the children difficult	0.0	21.9	33.8
Worried about my marriage	-10.7	22.5	2.2
Taking it out on the children	1.9	10.9	30.7

(Milne, 1977a)

In Table II (Milne, 1977b) he indicates the incidents of children's emotional and physical disorders. From this it can be seen that people did suffer emotional and psychological effects of the experience of Cyclone Tracy. More importantly those people who were evacuated and returned showed more stress than those who were not evacuated and those people who were evacuated and never returned, showed the greatest degree of stress.

TABLE II: Incidence of Children's Emotional and Physical Disorders

	STAYERS		RETURNED		NON-RETURNED	
	n=111 %		n=190%		n=348%	
Fear of rain and wind	22	19.8	46	24.2	102	29.3
Fear of dark	12	10.8	26	13.2	40	11.5
Fear of jet aircraft noise	5	4.5	15	7.9	54	15.5
Clinging to mother	7	6.3	10	5.3	44	12.6
Bed wetting	3	2.7	13	6.8	27	7.6
Thumb sucking	0	0.0	3	1.6	7	2.0
Temper tantrums	3	2.7	2	1.1	25	7.2
Fighting, biting, kicking	1	0.9	6	3.2	17	4.9
Deliberately breaking things	3	2.7	2	1.1	12	3.4
Injuries	0	0.0	5	2.6	19	5.5
Diseases and infections	11	9.9	11	5.8	38	10.9

(Milne, 1977b)

In a follow-up study as yet unpublished Milliken (1983) seeks to modify Milne's (1977a, 1977b) finding to indicate that the single biggest indicator of stress was the group who sought to return, but could not return for some reason or other.

'It is possible that the interpretation on p391 of Western & Doube might be revised somewhat against the possibility that some of the non-returned evacuees were suffering from the very frustration of not being able to get back to Darwin 'to get on with it'. The latter was not a result of the evacuation but of the sluggishness of the Housing Reconstruction Programme.'

(Milliken, 1983:175)

Even where the community is not removed or is only removed for a brief period, there can be long term effects of the disaster. Tichener and Kapp (1976), in discussing the effect of the Buffalo Creek disaster in West Virginia in which 125 people were killed and 4,000 left temporarily homeless, indicate -

'Disabling psychiatric symptoms, such as anxiety, depression changes in character and lifestyle, and maladjustments and developmental problems in children were evident more than two years after the disaster in over 90% of the individuals we interviewed.'

(Ericksen, 1979)

It should be mentioned that Buffalo Creek is a disaster because of the literal desolation of the town plus the fact that every family lost at least one member. A group action was taken by the residents and at that stage compensation of US \$13.5M was paid, of which US \$6M was for psychological damage. Such findings and actions and settlements will be more commonplace in the future. It is important that we take whatever action we can now, to ensure that the threat to the community is minimised. It has been suggested that if adequate support personnel are taken to a disaster area, they should always include people who are specialists in the field of therapeutic mental health. Specifically these people should not be the front - line counsellors, but rather be the support for those individuals who can provide direct-service counselling to the inhabitants. Where, however, it is demonstrated that the community has been so thoroughly destroyed that permanent damage has been done to the community, eg Buffalo Creek, or in fact there was no community in the first place, such as victims of an aircraft crash (really an emergency) who do not know each other prior to the disaster, then the outside expert must provide the front-line help and take on the role of providing the normative reference for those members.

To return to our first question, it might be argued that the individuals only behave badly in those circumstances where there has been a total breakdown of community, or in the Buffalo Creek situation, and where the norms and values are no longer available to act as a referant for them. The observations have rather been to the contrary that there is an immense amount of prosocial behaviour, if the community is allowed the opportunity to heal itself and the adequate support infrastructure is made available, so that it will not interfere with, and prevent, the re-establishment of the community infrastructure. The literature indicates countless examples of immense actions of heroism and sacrifice on the part of individuals in order to facilitate the community and members of the community. It is suggested that by the judicious use of appropriate resource personnel and the provision of facilities which will allow the community to function, that every attempt should be made to let that community re-establish itself.

RETURN TO ONE'S PLACE

The second question addressed the topic of why do people make the same mistake twice. Why do people who have been flooded return to the area in which they were flooded, why do people who have been flooded several times still return to the same area? An example of this is the Northey Street flood area of Brisbane, in which people have been evacuated on multiple occasions in the last ten years, yet on every occasion they returned to the same place. It would appear to be evident that the level of risk and the level of probability of re-occurrence is extremely high and the question is whether people accurately perceive the risk in which they place themselves. There is enough evidence to suggest

that people are poor perceivers of risk and that they do not accurately assess the situation (Britton, 1981). It is also observed that individuals will have different levels of acceptable risk. Fischhoff, Lichtenstein, Slovic, Derby and Keeney (1981) give some insight as to how acceptable risk may be perceived by individual members. It would seem that the ordinary linear models that argue for a rational economic man are in themselves, not sufficient to describe the behaviour of people who remain in areas that on all objective criteria must be seen as high-risk areas. Rather, it seems we need a new type of model.

The most exciting new theory in this area will be found in catastrophe theory, which is a mathematical model derived to deal specifically with landslides, and to try to explain the seemingly non-linear relationship between the calculated moments of force and the actual observed landslip. Such a model is of equal if not more relevance of a marriage relationship, or any similar event, but a new model taking into account all the social factors will not accurately predict events such as a breakdown in mental health, a breakdown of a marriage relationship, or any such similar event, but a new model such as that encompassed in catastrophe theories (Woodcock and Davis, 1980), may enable us to develop our understanding. It would demonstrate why people do return to areas where the pressures would indicate to an independent, seemingly rational observer that rebuilding in areas should not take place.

It is a relatively safe assumption that four disastrous events are likely to occur. The first is that there will be a major volcanic eruption, which will destroy or cause major damage to the township of Rabaul in New Guinea. Vulcanologists have predicted this for many years. During the early post-war administration of Col J K Murray of the Combined Territories of Papua and New Guinea he sought strenuously to have the town of Rabaul relocated. It was this attempt which angered the planter community and he believes it led to his replacement as Administrator and the triumph of the planter community who wished to retain their old plantation sites, and who were prepared to ignore the risk and certainty of further volcanic eruption. In California many homes are built on the San Andreas Fault. It is certain that at some time in the future there will be a major catastrophe in that area. It has been suggested that people who come to California from the eastern states tend to carry adequate home insurance cover for the first year and then on the advice of their neighbours terminate their policy and remain unprotected from the effects of a disaster. It is highly likely that there will be another major catastrophe along the fault line running from Napier (through the centre of Wellington) to the South Island of New Zealand. Wellington will be highly vulnerable because of its lack of alternative access roads and the limitations which exist on its airport which would prevent or hinder relief operations should there be a major earthquake.

In the Australian context it has been suggested that there is pervasive belief in many areas that government compensation and public contribution will be adequate to protect people in times of disaster (Smith, 1983). The disastrous bushfires in Australia on Ash Wednesday 1983 caused tremendous damage to property and were responsible for 65 known deaths. The bushfires following the tinder dry months were at times reported to move on a front travelling at a speed of some 60 kilometres per hour. There was nothing that could be done to prevent the bushfire spreading. Nevertheless it is almost certain that there will be minimal land rezoning in those highly attractive areas of South Australian and Victoria. Already there is evidence of people building in exactly the same location with exactly the same type of structure as before. In a few years they will have established the same type of gardens and undergrowth which will lead to another disaster of the same type.

Perhaps these are examples of acceptable risk which will be shared by the inhabitants and their insurers; or more likely the inhabitants, their insurers and the Australian public, through the political largesse of politicians who seem always to respond to the need for assistance during times of national disasters. The only real disaster is to suffer alone, because the sympathy is minimal. Perhaps people do make the same mistake twice and rebuild in high risk areas. In the absence of alternate models, rules and strategies, it is clear that all learning and adapted behaviour must revert to a previously learned mode of adaption. In the case where there is no other model it is inevitable that a person must revert to this earlier mode of adaptation. Yet this seems insufficient to describe all those occasions on which people have returned to disasters. It has been estimated that 5% of the Australian housing stock is at risk from flood because it's location in flood-prone areas. This represents approximately A\$50M to A\$60M in buildings which may be in jeopardy (Britton, 1982b).

This does not include business or other non-residential constructions. Post-flood surveys in the Queensland area of Brisbane/ Ipswich, and Lismore in New South Wales (both of which had severe flooding in 1974) have suggested that residential losses are only a minor component of the total flood in urban areas. It has also been suggested that it would be possible to purchase and rezone every flood prone house in Australia on a 1:100 flood return period for a relatively cheap sum of A\$300M. This over a period of years would not seem an excessive amount. Yet it is certain that such an action will draw immense resistance from the people who would be relocated in flood-free areas even when adequate compensation is paid. It is not only the loss of the initial dwelling which may be psychologically significant to the individual, but it is also the loss of neighbourhood and community that becomes important. In an innovative relocation program in Brisbane (Western & Cribb, 1983), in which the residents of Cribb Island were relocated, it was found that the residents moved to the same area and re-established exactly the same community in other parts of Brisbane as they had previously enjoyed on Cribb Island. The community was thus preserved.

FACTORS IN INSURANCE

At the beginning of this paper mention was made that one of the options available to people for minimising the effect of disaster, and to enhance the economic recovery of the individual and his family or business following natural hazard impact is through the purchasing of natural disaster insurance. Insurance has often been cited by natural hazard researchers as the key to the adoption of hazard-mitigation adjustments. It has also been recognized that insurance is a prime incentive in the move towards the efficient usage of hazardous areas. Within the natural hazard mitigation program insurance is seen as having two main functions. First, it is a loss-distributing device. Insurance coverage provides a means of recovery for affected persons and their damaged properties, and distributes losses without having to resort to more severe mitigatory devices, such as relief and welfare payments, loans for restoration, or declarations of bankruptcy. Second, insurance has the capability of guiding the development of hazard-prone areas by which people expose themselves to risk from hazard agents (see Britton, 1982b).

John Oliver, from the James Cook University's Centre for Disaster Studies, has summarised the role of natural disaster insurance thus -

'Insurance has been a time-honoured strategy for the mitigation of the impact of disaster for over a century. It has the potential for softening that impact. If an insurance cover can be economically effected, the victim of the material damage wrought by a natural disaster has more prospect of recovering himself, replacing his home, renewing damaged contents and re-establishing disrupted production facilities since he has at least the financial resources of the insurance payment with which to operate.'

(Oliver, 1983:1)

Members of the insurance fraternity will no doubt realise the significance of Oliver's statements, and recognise their veracity. As members of that fraternity, however, it will come as no great surprise to you, albeit an unwelcome one, to be told, probably yet again, that even though people may be aware of the positive qualities of procuring insurance, a large proportion of individuals do not actually purchase insurance. Even fewer appear to buy an insurance cover that safeguards themselves and their properties from natural disaster. Why is this?

This is a question which we set out to find some answers to in a recent paper (Britton, Kearney, Britton, 1983). Nothing not

already known or hinted at by researchers interested in the relationship between hazard insurance and the propensity to purchase insurance was found, but a reasonable contribution to that body of knowledge may have been made by codifying what was known and what had been published in a wide range of research literature. Perhaps the most significant contribution was the identification of a number of variables used by previous researchers who found them to be of importance in understanding the purchase of insurance policies. The formulation of these variables into groups of specific categories allowed the 32 identified variables to be placed within a more meaningful context. The five categories which we grouped these variables in were salience, information, awareness, experience, and insurance factors.

Salience, or the objective knowledge of a natural hazard problem which may have some effect on an individual's future behaviour, was found to be a function of the frequency of hazard events; the previous experience of a hazard event; the awareness of the proximity of the hazardous area in question to the individual; and the recency of the last hazard event.

Information is knowledge on which an individual modifies, initiates, or ceases action. Information is a set of facts or ideas gained through investigation, experience, or practice. Consequently, relevant information as it relates to the purchasing of natural hazard insurance is a function of the degree of lack of knowledge of the hazard's characteristics; intellectual overload; the socio-economic position of the individual; and the degree to which an individual under-estimates the potential threat; plus the factors identified as being relevant for salience.

Awareness is being alert to an action and paying attention to an action process. Awareness was mentioned in a number of the studies we examined, and can be regarded to be a function of the following variables: the level of risk-taking propensity; the types and number of defence mechanisms adopted by an individual; the influence of a person's significant others; the land occupancy rate; government policies and practices; sociocultural beliefs; and the time horizon which individuals (their encompassing cultures) orientate themselves to, together with the factors identified as relevant to the awareness group.

Experience is the internalising of events. Past experience is of immense relevance to current and future behaviour. When looking at the propensity to purchase natural hazard insurance cover, experience was found to be a function of the assets an individual has got which could be placed at risk; plus the loss of any previous assets especially through natural hazard intervention; tradition, or the 'accepted' way the sociocultural system achieves specific aims; the economic dependency a person has on the hazardprone area; the attitude an individual has got towards mitigatory devices; the cost of the mitigation devices;

the preferred risk level of the individual; the age and sex of the individual (the 'biodata'); the attitude of the individual towards insurance in general; and the attitude the individual has on hazards in general; plus those factors identified in the relevant information formulation.

The last category of significant variables which our study identified as important in the decision-making processes relating to natural hazard insurance purchase was insurance factors. The relevance of the insurance policy (including the cost of the premium); the policies and practices of the insurance company; together with the attitude of the insurance agent, are all important determinants in the actions of an individual to their insuring behaviour.

CONCLUSION

Our aim is to try to prevent those disasters which are preventable by structuring the physical and social environment. The use of land zoning provisions, building codes, warning systems, shelter provision and the vigilance of professionals and members of a community will do much to help manage the effects of a disaster.

It is important to go further and provide for those who have been affected. Adequate insurance, government assistance and public help do that to a greater or lesser degree depending on the circumstances. It is the social and psychological trauma which needs to be provided for. The most important help comes from the community itself immediately following the event. Both short and long-term effects will also be community based. There is a need to better understand these processes so that our help giving and support will not be counter-productive. This understanding is the research goals at the Centre for Disaster Studies at James Cook University of North Queensland.

REFERENCES

- Altman, I and Haythorn, W W. 1967, The ecology of isolated groups. *Behavioural Science*, 12, 169-182.
- Arneil, S. *One Man's War*. Melbourne: Sun Books, 1982.
- Barton, A H . *Communities in disaster: A sociological analysis of collective stress situations*. New York: Doubleday, 1969.
- Bettelheim, B. *The informed heart*. New York: The Free Press, 1960.
- Biernoff, D. Safe and dangerous places. In L R Hiatt (ed), *Australian Aboriginal Concepts*. Canberra: Australian Institute of Aboriginal Studies, 1978.
- Britton, N R. The Inangahua earthquake: An application of the Powell and Rayner model of disaster-time. Master of Arts thesis, Dept of Sociology, University of Canterbury, New Zealand, 1979.
- Britton, N R. Psycho-social effects of individuals in disaster: A review of relevant literature. Dept of Sociology mimeograph, University of Canterbury, New Zealand, 1980.
- Britton, N R. What have New Zealanders learnt from earthquake disasters in their own country? *Disasters*, 1981., 5, 384-390.
- Britton, N R. The natural hazard threat in Australia. *Hazard Monthly*, 1982. 3(5), 10-12. (a)
- Britton, N R. New Zealand society and earthquake insurance: Effectiveness versus avoidance? In M A Sherif (ed), *Proceedings of the Third International Conference on Microzonation for Safer Construction*, Vol I, Session II, 1982, 310-314. (b).
- Britton, N R. The bushfires in Tasmania, February 1982: How the disaster-relevant organizations responded. *Disaster Investigation Report No 6*. Centre for Disaster Studies: James Cook University of North Queensland, 1983.
- Britton, N R, Kearney, G E, Britton, K A. Disaster response: The perception of the threat and its influence on community decisions on insurance. In John Oliver (ed), *Insurance and National Disaster Management*. Centre for Disaster Studies: James Cook University of North Queensland, 1983.
- Bucher, R. Blame and hostility in disaster. *American Journal of Sociology*, 1957, LXIII, 467-475.

- Chamberlain, E R, Doube L., Milne G, Rolls M, and Western J S.
The experience of Cyclone Tracy. Canberra: Australian
Government Publishing Service. 1981.
- Chamberlain, E R, Hartshorn A E, Mugglestone H, Short P,
Svensson H and Western J S. Queensland flood report,
Australia Day 1978. Canberra: Australian Government
Publishing Service. 1981.
- Drabeck T E, and Quarantelli E L. Scapegoats, villains and
disasters. Trans-actions, 1967, 4(4), 12-17.
- Ericksen K T. In the wake of the flood. Boston: Allen &
Unwin, 1979.
- Festinger L, Riecken H W and Schachter S. When prophecy fails.
New York: Harper Torch, 1956.
- Fischhoff B, Lichtenstein S, Slovic P, Derby S L, Keeney R L.
Acceptable risk. Cambridge: Cambridge University Press,
1981.
- Fritz C E. Disaster. In R Merton and R Nisbet (eds), Contemp-
orary social problems. New York: Harper, 1961.
- Fritz C E and Mathewson J H. Convergence behaviour in disasters:
A problem in social control. Committee on Disaster
Studies. Disaster Study No 9. Washington: National
Academy of Sciences - National Research Council, 1957.
- Fritz C E, and Williams H B. The human being in disaster: A
research perspective. The Annals, 1957, 309, 42-51.
- Hamilton P. Aspects of interdependence between Aboriginal social
behaviour and the spatial and physical environment. In
Aboriginal Housing. Canberra: Royal Australian Institute
of Aboriginal Studies, 1972.
- Hebb D O. The organization of behaviour. New York: Wiley,
1949.
- Kearney G E. Some behavioural aspects of response to natural
disasters. In Large Earthquakes in New Zealand: Antici-
pation, precaution, reconstruction. Wellington: Royal
Society of New Zealand, Misc Series No 5, 1981.
- Kearney G E, and Reser J P. Caring for the community in disaster
situations: The long-term aspects. In John Oliver (ed),
Response to Disaster. Centre for Disaster Studies: James
Cook University of North Queensland, 1980.
- Kinston W, and Rosser R. Disaster: Effects on mental and
physical state. Journal of Psychosomatic Research, 1974,
18, 451- 2.

- Linton R. The Study of Man. New York: Appleton Century Crofts, 1936.
- Maslow A H. Motivation and personality. New York: Harper and Row, 1954.
- May, Rollo. Anxiety and values. In Charles D Spielberger, Irwin G Sarason and Norman A Milgram (eds), Stress and Anxiety, Vol 8. McGraw-Hill, 1982.
- McBride D. Psychosocial stress and natural disaster. In Joan Innes Reid (ed), Planning for People in Natural Disasters. Department of Behavioural Sciences: James Cook University of North Queensland, 1979.
- Milliken E P. The sociological, psychological and economic effect of rehousing Darwin people after Cyclone Tracy. Prepublication report to Australian Housing Research Council, Darwin, 1983.
- Milne G. Cyclone Tracy I: Some consequence of the evacuation for adult victims. Australian psychologist, 1977, 12 39-54. (a)
- Milne G. Cyclone Tracy II: The effect on Darwin children. Australian psychologist, 1977, 12, 55-62. (b).
- National Health and Medical Research Council. The psychological management of people involved in major disasters. Canberra: Australian Government Publishing Services, 1983.
- Oliver J. Summary of meeting. In John Oliver, Insurance and natural disaster management: Panel and plenary discussion. Centre for Disaster Studies: James Cook University of North Queensland, 1983.
- Pavlov I P. Lectures on conditional reflexes, Vol 2. London: Lawrence & Wishart, 1941.
- Quarantelli E L. The consequences for mental health: Conflicting views. Disaster Research Centre: Ohio State University. Preliminary Paper No 62, 1979.
- Simpson-Housley P. Influence of locus of control and repression sensitization in perception of natural hazards. Doctoral dissertation, Department of Geography, University of Otago, New Zealand, 1976.
- Smith RGA. Problems of natural disasters insurance in Australia, the range and scale of the problems, changing conditions and policies. In John Oliver (ed), Insurance and Natural Disaster Management. Centre for Disaster Studies: James Cook University of North Queensland, 1983.

- Stretton A. The furious days: The relief of Darwin. Sydney: Collins, 1976.
- Stretton A. Soldier in a storm: An autobiography. Sydney: Collins, 1978.
- Tichener James I, and Kapp Frederic T. Family and character change at Buffalo Creek. American Journal of Psychiatry, 1976, 133, 295-9.
- Torry W. Hazard, hazes and holes: A critique of 'The Environment As Hazard' and general reflections on disaster research. Canadian Geographer, 1979, 23, 4.
- Wenger D E. Community response to disaster: Functional and structural alterations. In E L Quarantelli (ed), Disasters: Theory and Research. Beverly Hills: Sage, 1978.
- Western J S and Milne G. Some effects of a natural hazard: Darwin residences of Cyclone Tracy. Paper presented at a Symposium on Natural Hazards, Canberra, May 1976.
- Western J S, and Cribb D. Personal communication, 1983.
- Wilson R N. Disaster and mental health. In G W Baker and D W Chapman (eds), Man and society in disaster. New York: Basic Books, 1962.
- Woodcock A, and Davis M. Catastrophe Theory. Harmondsworth: Penguin, 1980.
- Yi-Fu, Tuan Topophilia. New Jersey: Prentice Hall, 1974.

INTERDISCIPLINARY DISASTER RESEARCH

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Disaster research is asking scientific questions about Acts of God. During the last ten years efforts have been made to understand the causes of natural and man-made disasters, to determine how people are affected, and how material and mental relief can aid recovery. Such research as has so far been carried out in isolation, has followed the old academic tradition of investigating separate disciplinary problems. Yet to come, and urgently needed, is the interdisciplinary investigation of disasters, where for example seismologists, social scientists and civil engineers work together as a team to study earthquakes in general and together make an in-depth hindsight review of a particular seismological event. This paper will attempt to point the way to more interdisciplinary disaster research.

DEFINITIONS OF DISASTER

Asking scientific questions about Acts of God is hardly an adequate definition of the subject. I have defined interdisciplinary work elsewhere as originating from the joint and continuously integrated effort of two or more specialists of different disciplinary background and training. Research is easy to define and it appears as: "a course of critical or scientific inquiry" in the Shorter Oxford English Dictionary, Third Edition, 1977. It is only when we come to Disasters that our difficulties begin as there is no agreed definition, nor is there a scale of magnitude. In a previous paper I gave on this subject (Disasters Past and Future, 1972) I suggested the following definitions :

ACCIDENTS	1 - 1000 people dead or in immediate danger of death.
DISASTERS	1000 - 1 million people dead or in immediate danger of death.
CATASTROPHES	More than 1 million people dead or in immediate danger of death.

These definitions are by no means adequate. Consider for example the destruction of the City of Darwin by Cyclone Tracy in December 1974. Only 65 people died and there was no imminent danger of death to the population of 45,000; this danger would only have occurred if a lethal epidemic had broken out. Yet it was undoubtedly a real disaster in terms of the total destruction of a city and the suffering it caused to its inhabitants.

Harold D. Foster of the University of Victoria, BC, has so far given the most comprehensive definition of disasters and their magnitude. (Professional Geographer 28, No 3, 241, 1976). His scale is built around a social stress rating, derived from an individual's loss, or change subsequent to being involved in a disaster. He derived a number of formulae, allowing for the differences between developed and under-developed countries, to arrive at the total stress caused during a disaster. The terms in his formulae included the number of fatalities, of seriously injured, the stress values and the number of the total population affected. He derived a logarithmic magnitude scale for a number of famous disaster events, for example: Black Hole of Calcutta of 1756, magnitude 5.0; Titanic sunk 1912, magnitude 6.1; World War I, 10.5; World War II, 11.1; Atomic Bomb, Hiroshima 1945, 8.2; Earthquake, Managua 1972, 7.9; Cyclone Tracy, Darwin 1974, 6.6. These magnitudes on Foster's logarithmic scale, as derived from his formulae, are directly correlated with the total number of stress units, in the hundreds of millions.

I am not aware that the Foster scale of disasters has found universal acceptance as it neglects the difficult-to-assess damage to structures and environment. Yet a universal scale of disaster magnitude would be most valuable both for researchers in this field and for those in charge of relief operations. It might well become as universal as the logarithmic Richter scale for earthquakes.

In this paper, having inadequately defined disasters, I shall attempt to review such systematic disaster research as has occurred and mention some of the results. Again this can by no means be definitive and can only point others in the right direction. After that I want to talk about two types of natural disasters, before coming to man-made disasters and what I would call nuclear accidents. Finally I shall arrive at some conclusions about disaster research by suggesting the need for an International Disaster Research Laboratory.

WHY NO RESEARCH

Disasters, both natural and man-made, are unpredictable but inevitable. We might now know where they could occur but

not when. Each disaster appears to differ from its predecessor, and hence a lack of incentive to carry out research may appear understandable. And who is to fund such research? There is no industrial and profitable infrastructure to encourage it, nor are the academic and scientific communities keen to consider disaster research a subject of pure knowledge, worthy of investigation per se. Would insurance companies not make larger profits if they had to pay smaller indemnities to those who had applied the results of disaster research? For example, adherence to building codes for earthquake-proof buildings is rewarded by lower insurance premiums in California.

Another reason for the lack of disaster research is the impossibility of creating artificial disasters for experimental purposes. Yet model experiments are undertaken routinely where macro-engineering projects are involved. For example, elaborate hydrodynamic flow tests were carried out before the Thames Barrage was built. Mathematical computer models should prove of great value in disaster research, but so far few have apparently been carried out and reported in the literature. Other scientific disciplines are also difficult to study by experiment, as for instance astronomy. Yet great knowledge of the planets and the stars has been obtained by observation, hypothesis, and renewed observation, refining the instruments for each successive examination.

INTERNATIONAL LABORATORY

There appears to be no theoretical reason why an International Disaster Research Laboratory should not be set up and supported by rich insurance companies. There interdisciplinary research on earthquakes, floods, fires, volcanic eruptions, tsunamis, drought, hurricanes, frost and other meteorological phenomena, landslides and erosion, could be studied in depth by all the many scientific disciplines which must contribute to progress in this field. I shall outline a research programme for such a laboratory a little later on.

INTERDISCIPLINARY PLANNING

Pre-disaster planning is so far the best example of interdisciplinary work in this field, and a considerable literature on disaster planning has accumulated. Advanced Planning for Disaster Relief (Pergamon 1979) a small book by Barbara J. Brown, was a detailed project undertaken for the United Nations Institute for Training and Research, UNITAR. It contained much sound advice for planning before disaster

strikes, particularly for the Third World and also for Donor Countries. For the richer and more developed disaster-prone areas in the US and in Canada Professor H.D. Foster of the University of Victoria, BC, has contributed an excellent research effort in his book Disaster Planning, The Preservation of Life and Property (Springer Verlag, 1980). Each of his chapters contains extensive lists of references and the work is highly recommended to all concerned with pre-planning, be it safer design of structures, the prediction and prevention of disasters, and disaster warning systems. Both Brown and Foster have done much research for their surveys. If their advice were only half followed, innumerable lives would be saved in the next disaster. At present, on an average, there are each year 250,000 deaths and \$ 15 thousand million damage due to disasters.

INTERDISCIPLINARY SOCIAL SCIENCES

A very wide-ranging, large-scale survey of natural disasters, in their interdisciplinary relation to human populations and demography, was begun in 1981, and still continues, by J.F. Coates Inc., a consulting firm in Washington; they received a grant from the National Science Foundation for this work. A massive literature search of the social sciences in relation to disasters accompanied the survey; it can only briefly be summarised here. A total of 17 hazards was considered, ranging from earthquakes to bush fires, from tsunamis to drought and snow avalanches. It was found that Disaster Research at various levels was now being carried out at Ohio State, Clark, Toronto, Chicago and Colorado Universities. The well-known newsletter, Unscheduled Events, founded in 1963, will in future be published by the Research Committee on Disasters; other publications in this field include the International Journal of Mass Emergencies, the Hazard Monthly, in its third year in 1981 and the Natural Hazard Observer then in its seventh year.

Coates found that overall migration of the US population affected the likely future of disasters. With people moving into the Sunbelt of Texas, California and Florida, well known high hazard areas, future disasters may have much higher mortality figures. On the other hand, deaths from snow, lightning, frost and tornadoes in the North Central States would diminish, simply because people had moved away from these areas.

In more general terms, Coates stated that man ignores, forgets and discounts hazards from natural disasters. Without any real experience of them, the risks from hurricanes and earthquakes seem uncertain, indefinite and even unlikely. Compared to our many other pressing concerns, of immediate

attention demand, natural hazards receive low priority.

Coates and his team of researchers maintained that, at least in the US, people did not panic after a disaster and that looting was only a minor problem, although such behaviour was widely believed to occur. Rich and poor had widely different reactions to disasters and saved themselves in totally opposite manner. People always converged on disaster sites, either to watch or to help, and hindering rescue workers. Most disasters have no long term effects, either social or economic, on communities; elderly people do not always agree to be evacuated, and if they remain, they can have a major effect on the morale of disaster victims. Coates pleaded for three kinds of social science research on natural disasters: long-term studies, lasting years and decades, of the same topic and of the same region; more cross-cultural and international studies, and particularly a vastly increased amount of field research after disasters.

INTERDISCIPLINARY TECHNOLOGY

If the Coates Survey confined itself to the interdisciplinary aspects of human behaviour before and after disasters, then another Washington investigation in March 1977 considered The Role of Technology in International Disaster Assistance from an equally broad and interdisciplinary point of view. This workshop created by the US National Academy of Sciences, which also published its Proceedings, underlined the fact that no technology related to disasters is an economically profitable field, and if it is funded, then only erratically, if at all. It is well known that, whatever the disaster, any rescue equipment brought to the scene is of standard manufacture and must be adapted at the site to the special needs of the occasion. Some of the conclusions and recommendations of the workshop may not be well enough known and should be repeated here.

For immediate disaster rescue, heavy gear is essential, be it helicopters, boats or simply gin poles to lift heavy rubble, or parts of destroyed buildings. In pre-planning operations for disaster-prone areas, it should be borne in mind that military surplus is ideal, as it can be bought at a fraction of the normal cost from commercial sources. Care and maintenance of tractors, assault boats, power-shovels and other items so acquired, can be arranged with nearby military establishments. Training in its use should have top priority for the community, as after a disaster there will always be unaffected volunteers anxious to help. Furthermore, official aid can thus be saved for major aspects of rescue.

Many other ingenious adaptations of readily available goods were suggested; for example large plastic garbage bags can give an instant shelter for people to protect them from wind and rain. Torches, and audible distress signals can be distributed or airdropped before or during floods, and particularly valuable are small radio receivers; these proved essential during the Darwin disaster.

DISASTER COMMUNICATIONS

Communication equipment puts control into the hands of the decision makers. General Alan Stretton's The Furious Days (Collins, Sydney 1976) should be read by any disaster planner as it is the best available account of dealing with a disaster situation - the case of Darwin destroyed by cyclone in 1974 - that has yet to come to my notice. Over 3,000 radio receivers were air-lifted into Darwin and proved vital to keep up morale; Stretton broadcast regularly twice daily after their arrival. Equally important are communicative facilities for the press and the media, who will inevitably flock to the site of any disaster; nothing can be more frustrating for the press than to be unable to transmit their reports back to their home base. During large scale disasters, foreign Governments and International Aid Organisations often send aid for prestige purposes, and their prestige as well as further aid will vanish if media reports do not describe in glowing terms what their help has achieved.

SATELLITES

If satellite systems are available they will of course be most valuable for international traffic. The plan much discussed by the International Telecommunication Union, the United Nations Agency responsible for all telecommunications, to have small portable antennae for underdeveloped countries for disaster communications via satellites, has apparently not yet been used. A booklet on this subject, entitled Space Radiocommunications System for Aid Following Disasters was published by the I T U in 1975.

The first Satellite for Emergencies, SAFE, was proposed by H S Wolff in September 1964. From a hand-held and hand-cranked transponder an interrogation signal from a satellite in polar orbit would be re-transmitted to a ground station. This would give knowledge of the existence of an emergency, and if two such satellites were available, also its location. In his pioneering publication on the subject, Wolff called it a "Technologically feasible pipe dream".

NASA's first Applications Technology Satellite, ATS-1, launched in 1966, transmitted 800 to 900 emergency medical calls per year during its 10 year life, linking doctors with remote villages. A natural technological development from "Flying Doctor" to "Space Doctor"!

One of the first uses of satellite communications during a disaster occurred in July 1977 when Johnstown, Pennsylvania, was flooded. A portable 4-foot (1.2m) antenna was set up at a local school and allowed Red Cross officials to communicate with their headquarters in Washington; the satellite used was NASA's Communications Technology Satellite, CTS, launched in January 1976 into a synchronous orbit and stationed just west of South America over the equator.

Today there are many communication systems available in developed countries and some even in less fortunate areas, be they troposcatter links, cable systems when telephones have been restored, microwave radio, VHF and UHF frequency modulated radio. Small portable intercom-radio equipment will allow those in charge of operations to keep in constant touch with headquarters. All communication in a disaster area should be tied together to establish a total emergency communication system.

But to return to the Washington Workshop on Disaster Technology and one of its final recommendations when considering Search and Rescue: after a disaster, a physical point of orientation is a vital necessity for people who have lost their normal orientation, for receiving of services and advice, for them to be counted and identified, for collecting families and possessions, and as a staging point. This would be necessary for any evacuation, as was the case in the Darwin disaster when in five days 25,000 people were airlifted to the Southern Capitals of Australia.

DISASTER RESEARCH HISTORY

Disaster research, often highly interdisciplinary, has of course also been carried out in other countries, although I am only aware of such work in England and in Australia. It was undoubtedly stimulated, if not started, by one of the greatest disasters in modern history, the cyclone and tidal waves in East Pakistan during November 1970. It was also the worst example of disaster relief. An estimated 500,000 people died as a direct consequence of the event, but had the relief been organised and co-ordinated, thousands would have been spared. The Archdeacon of Westminster, the Venerable Edward Carpenter voiced the thoughts of many who had followed the incredible bungling, the corruption and delays, the deficiencies and scandals, which attended the events in East Pakistan: "The feeling of guilt of the affluent West that in our highly technological age, capable of putting a man on the Moon, forces, so age-old and elemental, could bring about such a disaster". Yet, 14 years later, it appears that half a million Pakistanis did not die in vain.

Two years after Pakistan, in October 1972, the Royal Army Medical Corps held Exercise Helping Hand in Hampshire, England, to which representatives of all the Army Medical Corps of the West had been invited to consider in what manner their Medical Corps might contribute to disaster relief, more efficiently and more cost-effectively, than had been the case in East Pakistan. I was greatly honoured on that occasion by an invitation to give the key-note address Disasters Past and Future in which I pleaded for the establishment of an International Rescue Organisation - it still does not exist.

A few months earlier, in March 1972, the United Nations set up in Geneva an Office for its Disaster Relief Coordinator, generally referred to as UNDRO. It has a communication room

in the United Nations in Geneva with telephones and telexes. The funds allocated to fulfil its true function of co-ordination have been woefully inadequate and its own review report in 1980 was generally considered a disaster itself. (London Times, 11 November 1980).

It was also in 1972, though probably not as a consequence of the Pakistan disaster, that the Civil Defence Directorate of the Commonwealth of Australia was relocated and that its function changed from Civil Defence to Counter-Disaster activities; these activities were formalised on 1 January 1975 and the College received its present name, the Australian Counter Disaster College on 1 January 1978.

Perhaps more directly traceable to the Pakistan disaster is the British Disaster Unit set up in 1974 as part of the Ministry of Overseas Development. Regrettably, like UNDRO, the funds and organisation at its disposal are quite insufficient to make a major impact on relief, although small sums are regularly dispatched to overseas governments when disasters occur.

In England it was the Disaster Research Unit of the University of Bradford which started in December 1973 in order to increase awareness of pre-disaster planning, including research on precautions to be taken before the event. Their team went to the Bahama Islands for field research to study pre-planning and, after two years' existence in 1975 seven occasional papers had been published. Parallel to the Bradford Group, the London Technical Group started work in 1972 on disaster research as a direct consequence of the Pakistan cyclone and in 1978, the International Disaster Institute developed from the London Group. It had extreme financial difficulties in starting its work, as it was attacked by the voluntary disaster relief agencies who feared that some of their work might be critically analysed. The prime aim of the Institute is to make disaster relief more effective through research.

An outstanding example was their investigation of the effectiveness of large scale vaccination in developing countries following a breakdown of normal life after a disaster. In the past it had never proved possible to vaccinate a complete population at risk, and if a small proportion only can be vaccinated at random, the epidemic cannot be contained. Much better, LTG concluded, to conserve the available supply, watch for outbreaks, then vaccinate and thus contain the epidemic; this of course depends on local conditions and the particular disease. Similarly the distribution of vitamin supplements was found to be a waste, as deficiency diseases appear only after long periods of deprivation.

END OF METHODOLOGY

So far I have reviewed what might be called the methodology of disaster research, I have pointed to the inadequacy of

interdisciplinary research and the preponderance of pre-disaster planning advice. The need for an International Disaster Research Laboratory appears to me overwhelming. And this is particularly so as disasters are on the increase world wide. The reasons are not only the population explosion in the underdeveloped countries, but also the steady movement of populations into cities, increasing living standard and hence greater loss during a disaster, and in the last decade the location of industries in disaster areas. For example off-shore oil platforms in the North Sea, exposed to the dreaded winter storms, and in the Gulf of Mexico, exposed to cyclones; also the erection of high-rise hotels along hurricane exposed coasts.

Similarly it appears that after the relative quiet of 1950-1980, earthquakes are again becoming more frequent; however, there is a lack of historical research, only in China and in Italy are records available extending over 2,000 years. We need to know the 'repetition period', the 10, 100, 1000 year event, as present accurate knowledge extends at most over a 30-50 year period.

HISTORICAL EARTHQUAKES

I would now like to turn to a more detailed consideration of earthquakes. Here there is one splendid example of historical disaster research, the in-depth hindsight review which is so much needed for all types of disasters. It was Professor N.N. Ambraseys of Imperial College, London, who made a profound study of the history of earthquakes and reported some of his results in 1976 (UNESCO Courier vol. 29, May p. 24). Using all possible human documentation during the last 2,000 years, he found for example that after the earthquake in 25AD which destroyed the town of Taxila in Northern Pakistan, stronger houses were built with special foundations, going down to as much as 5m. Elsewhere, builders learnt after destructive earthquakes to reduce the heights of new houses from three and four stories to only one or two. Grids of wooden beams were also used to strengthen foundations.

On a more historical basis, he found that areas free from earthquakes at present were previously the centres of such events, and conversely. He also found that single large earthquakes during the last 25 centuries had little or no effect on a stable and developed community. Personal, political, religious and particularly economic interests seemed to overshadow the lessons to be learnt from earthquakes. As an example, Ambraseys mentioned Antiochia in Turkey: in 115 AD, the city was almost totally destroyed but was rebuilt on the same site, to be destroyed again in 458 AD, but was again rebuilt on the same spot. A generation later a further earthquake led to the death of 200,000 lives, yet the city was once again rebuilt in the same place, finally to be destroyed in 540 AD by the Persians. However, should the affected community be poor and politically unstable, earthquakes may bring about great social

changes, such as population movements, emigration and conquests by enemies.

Earthquake prediction also has a venerable history, Ambraseys discovered; soothsayers, astrologers and various prophets all tried their hand. There was for example the Cadi (judge) in Eastern Persia who in 1549 predicted an earthquake in his city. In vain did he try to persuade his friends to spend the night in the open, away from their houses. His pleading was fruitless and for a time he was alone in the open during the bitterly cold night. Eventually, not being too sure of his own prediction, he returned to his house, only to be engulfed together with the 3,000 people who perished in the earthquake.

PREDICTIONS AND PATTERNS

After more than 500 years and in spite of some recent scientific research we are still quite unable to predict earthquakes. A Panel on Earthquake prediction set up by the US National Academy of Sciences, Washington DC, concluded in 1976 that "imminent routine prediction of earthquakes is not warranted". A program of reliable, routine prediction may be 10 or more years away, and even then there might be "unavoidable errors and false alarms". Even the Chinese claims for earthquake prediction cannot be fully accepted on a strictly scientific basis and much further research will be required.

Earthquakes appear to follow certain patterns, but so far their analysis has hardly yet begun. Charles Richter who in 1932 originated the Richter Scale of earthquake magnitudes, gave in 1976, a year of great tectonic activity an outline of earthquake patterns. From 1896, when the first accurate measurements were made, to 1906 there was high activity, with 1906 being particularly notable with five earthquakes of magnitude 8, including of course the San Francisco event. In the following years there were on average only one or two events a year of such magnitude, until 1950, when there was again great activity. From 1953 to 1964 there was again a respite, until the great earthquake in 1964 in Alaska. After further years of relative absence, the year 1976 was once again one of great activity with major earthquakes in Mexico, Iceland, Italy and Turkey, China, Bali and Japan, the Philippines and New Guinea. Correlations of these patterns with other geophysical and possibly astronomical events presents a great challenge to disaster research, which may only now be possible by powerful computers.

NAPLES EARTHQUAKE

Let us now turn to a recent earthquake, the one that hit Southern Italy on 23 November 1980 which exemplified the worst possible human behaviour. It struck not far from Naples one of the poorest districts of the country, a mountainous, isolated region where peasants obtained a meagre living from olive trees and a few cattle. The number of dead has never been officially stated, the figures ranged

from 4,000 to 5,000. Like all disaster victims, the local peasants were stricken with terror and at first quite unable to help themselves. It was at that stage that all outside aid was lacking and for four days after the earthquake, hardly any constructive help reached them, except the criminal elements to exploit the situation. Contemporary newspaper accounts (London Times and Frankfurter Allgemeine Zeitung) were full of ghastly stories which one cannot dismiss. Amongst the bus loads of sightseers, eager to photograph the events, were smart cars with well-dressed persons. They did not come for pictures, but left with babies and young children, perhaps only stolen for themselves, but likely to be sold for adoption. Others were satisfied with simply stealing relief goods and selling them on the black market, a type of behaviour not unknown after most disasters in developing countries. There is a saying in Turkey that each earthquake makes one millionaire, the bad ones several.

In Italy, in November 1980, there was a total lack of command structure, locally as well as from central Government in Rome. In fact the disaster had severe political repercussions, as politicians accused each other of mismanagement and corruption leading to resignations. Worst was the opposition to evacuation of the most seriously damaged towns, as local politicians feared that this would lead to the loss of their electorate at the next election. Undoubtedly, as in all disasters, there must have been many acts of heroism and utterly unselfish behaviour; so for example a group of German volunteers with their specially trained dogs flew to the area and the dogs discovered at least some victims under the rubble. It was also reported that 13,000 soldiers were brought to the disaster area, but as they only carried their rifles and had no picks or shovels, they only added to the need for food, housing and transport which should have been reserved for the disaster victims. And all this in spite of strict laws which had been passed by the Italian parliament a few years previously to set up a Disaster Relief and Command Organisation; the laws were simply not implemented.

INSURANCE

Finally a word about earthquake insurance. If there was to be a repeat in Japan of the Kanto earthquake of 1 September 1923 with 143,000 dead, the present total damage would amount to $\$250 \times 10^9$. This has led to a country-wide Japanese insurance scheme but covering only 30 per cent of damage. It is therefore only a minimal help to start rebuilding. However, the Chemical industry can only be insured for 15 per cent. Similar calculations for damage of San Francisco and Los Angeles reach for each city the sums of $\$50 \times 10^9$; Insurance against earthquakes, however, is hardly more than 10 per cent. There are far too few instances of insurance companies demanding earthquake-proof constructions to decrease their premiums.

HURRICANES, FLOODS

The second major type of disaster to be considered concerns tropical circular winds and the floods often caused by them. The worst in recent history, the East Pakistan near-catastrophe, has already been mentioned. A potentially equally dangerous situation exists along the whole east coast of the United States, and although many separate analyses have been made, there appears to be as yet no interdisciplinary assessment of what might lie ahead. During this century many tropical storms have hit the east and south coasts of the United States, including the worst disaster in US history, the drowning of over 6,000 people after a hurricane struck Galveston on 8 September 1900. Since then windspeeds of up to 135 m.p.h. and tides 15 to 20 feet above normal have occurred in the same area ten times, yet the death toll has steadily decreased and thus brought a feeling of false security to the 300,000 people now living permanently below the 20 foot elevation in that area. During the holiday season, this number may double and similar dangers exist the whole way along the Gulf Coast and the eastern areas of the United States.

In addition, large demands for ground water, both industrial and residential, have lowered the ground level, and erosion of sand dunes and beaches has increased the danger. Much has been written, yet little can be done to reduce the real danger if a major hurricane should strike again. Advance warning, from satellites and computer forecasting, has been responsible for lowering the death toll, yet the maximum prediction time which can be broadcast is 10-12 hours, leaving a 50 mile error on either side. Evacuation is beginning to be countered by forecasts of massive jamming of traffic, even if roads are not flooded or otherwise damaged.

Protection against hurricanes along exposed coastal areas has cost Miami \$64 million, recreating a 300 foot wide strip of new sand, 12 miles long. In other areas further north the building codes are not strict enough and timber houses replace those destroyed during the previous tropical storm. Galveston after the storm of 1900 constructed a huge sea wall facing outwards to the Gulf, but has failed to protect its shores facing inwards. When on 2 September 1981 nearly a foot of rain fell during 24 hours and four small tornados hit the town, the damage was estimated at nearly \$ 5 million, but not a single person was hurt. Yet it is doubtful if Galveston can survive another 1900 hurricane without a death toll in the tens of thousands. It is simply called the irreducible residue of risk, shrugged off by saying "it may not happen to me".

In comparison with the east coast of the United States, Australia may perhaps call herself fortunate that Cyclone Tracy has given Australian Disaster Planners a lesson which will be remembered for decades. Hardly had the Natural Disaster Organisation been set up in Canberra and Major-

General Alan B. Stretton been appointed its Director-General, than Cyclone Tracy devastated Darwin on 25 December 1974. During the following seven days Stretton was appointed by the Australian Government to act in complete command of all relief operations, being himself stationed in Darwin. After the historical evacuation of three-quarters of the inhabitants and restoring major facilities in the town, General Stretton summed up the following lessons to be learnt: Apathy syndrome, communications breakdown, failure of local radio stations, convergence of visitors to disaster area, legislation needed, lack of co-ordination of relief stores, registration and tracing of disaster victims, first aid instruction at secondary school level in disaster-prone areas, the requirement for centralised control of all disaster areas.

"Disasters caused by enemy attacks are possible, but disasters caused by natural phenomena are certain", Stretton concluded. It does happen in the history of science that one exceptional individual can combine knowledge of one or more disciplines and can thus greatly contribute to interdisciplinary progress. In the history of disaster research General Stretton deserves such a place.

LONDON FLOOD BARRIER

Like Darwin, the story of the London Flood Barrier is equally instructive. Had any interdisciplinary research been carried out in connection with the real danger of a London disaster, the preventative measure of building the largest movable flood barrier in the world could have been avoided. London, like many other towns situated on rivers and near their estuaries, has been flooded many times in its history. But only research in recent decades has determined the particular dangers threatening London. There was the gradual sinking of the southeast of England, about 2.5 cm per century, as an after-effect of the last ice-age. Then the existence of the North Sea storm surges was recognised when a meteorological anti-cyclone to the east and a cyclonic depression to the west of England combined to rush masses of oceanic water around Scotland into the funnel between Denmark and England. A further factor was the dredging of the sandbanks lying in the estuary to allow bigger ships to enter the Port of London. Thus in January 1953 a storm surge coincided with high spring tides and more than 300 people were drowned along the East coast; in the Netherlands the same floods killed 1,400 people. Fortunately the flood of 1953 did not coincide precisely with the Thames high tide, and London itself was spared. London was not so lucky in January 1928 when tides and storm coincided and 14 people died. It was then that the proposals for a flood barrier were first considered and the 1953 events strengthened the demand. However it took precisely 30 years before the barrage was completed at Woolwich and was first used in earnest on 1 February 1983. In those 30 years there had been innumerable reports, warning of the catastrophic consequences if 45 square miles of London had been flooded,

with 50 underground railway stations, 35 hospitals as well as the heart of Government in Whitehall inundated. Damage was estimated at thousands of millions of pounds sterling, casualty figures in the tens of thousands.

Elaborate rescue plans code-named "Operation Giraffe" had been formulated by the Armed Services, with forward and rear command posts, with hundreds of assault boats and helicopters on standby. Fortunately these often rehearsed plans have never had to be implemented. But the most extraordinary aspects of the London Flood was the barrier itself. From bank to bank, over half a kilometer long, the barrage consists of four main navigation spans, each 61 m wide. These can be closed in 30 minutes by vertically rising steel sectors, which normally lie below the river bed to allow free navigation. This macro-engineering project cost more than five hundred million pounds and was demanded by the influential shipping interests of the City of London. It will be the biggest movable flood barrier in the world until the Delta Plan of the Netherlands is completed.

What nobody had foreseen, inspite of years of engineering research on the Thames Flood Barrier, was the complete change in social and economic forces during the 30 years from 1953 to 1983. Shipborn container traffic had concentrated at the Tilbury Docks, 20 km downstream from the barrier, and the docks above the barrier, for which navigational access had been requested, had become derelict and abandoned. A much simpler dam with one or two standard locks would now seem perfectly adequate for the few small ships steaming up to the higher reaches of the Thames. Was this totally unforeseeable?

MAN-MADE DISASTERS

Let us now turn to man-made accidents and disasters. By definition, accidents are unforeseen contingencies, and unpredictable. But that they are also inevitable, is only now slowly being realized. Nothing, but absolutely nothing, made by man is perfect and therefore everything will have inherent faults, be they in design, materials or manufacture. All that the best of engineers can aspire to achieve is to reduce the number of accidents, to accumulate sufficient experience, allow a large enough safety factor and include one or more back-up systems to continue operations when a component fails. And most important of all, where humans are involved, provide for their utmost training by the simulation of all kinds of accidents and supply the operators with instruments of simplicity, clarity and reliability.

TANKER DISASTERS

Accident statistics for the operation of large tankers make unhappy reading, not only for the owners and operators, but for all concerned with past and potential future disasters. So for example in 1978, the Amoco Cadiz spilled 220,000 tons of oil onto the coast of Brittany in Northern France; but the

number of dead during that year was only 29. In the following year, the total spillage of oil during all accidents was only 105,000 tons, but 177 died, and four tankers exploded. In a wide-ranging interdisciplinary review of tanker safety Captain R. Maybourne (J. Roy. Soc. Arts, July 1980) admitted that accidents occurred because of human error, slackness in obeying operating procedures, and because of the irreducible residue of risk; better training was the most promising answer in his opinion.

However, Captain Maybourne only dealt with the transportation of oil, not of liquefied gases, either natural gases LNG, or refined petroleum gases LPG. Their flammability and the necessity to carry them in highly compressed and liquified state at -175°C makes them certainly the most dangerous cargo carried at sea. On 16 December 1980, the LNG tanker Taurus, capacity 125,000 cubic metres ran aground off the west coast of Japan while carrying its cargo from Indonesia to Japan. Fortunately no serious consequences arose unlike the fictional story of the LPG Tanker Prometheus, whose fate was described a year earlier by Terence Moan in his disaster fiction book The Deadly Frost (Ballantine Books). Prometheus struck a submerged but uncharted obstacle inside New York harbour, ripped her hull and part of her cargo escaped onto the surface of the water; her capacity was $123,000\text{ m}^3$. A weather inversion at first prevented dispersion of the gases, later they penetrated the New York subway, finally they ignited and the ship exploded. Damage and loss of life were great, as can be expected if such a scenario should ever become reality. Meticulous research had been carried out by the author to describe the disaster and the tale is highly recommended to any port authority contemplating the dangers arising from the transport of liquified gases.

So far the worst accident caused by an LPG explosion occurred on 11 July 1978 when a road tanker carrying 23.5 tons propylene exploded near a holiday camp on a road running parallel to the north east coast of Spain; 200 people were killed instantly, over 150 suffered severe burns. The causes for the explosion were variously attributed to overloading, lack of a pressure relief valve, corrosion, as the tanker had been occasionally used to transport ammonia. and the high summer temperature of 28°C ; most likely it was a combination of several factors that led to this accident.

CHEMICALS AND OIL INDUSTRY

Some of the worst man-made accidents have occurred in the chemical industry. In Ludwigshafen, West Germany, 550 people were killed in 1921 during an explosion and subsequent fires, and in 1948 a similar accident in the same town killed 184, 70 were missing and 6,000 were injured. When two cargo ships carrying ammonium

nitrate collided in the port of Texas City, Texas, in 1947, exploding and setting on fire an oil refinery plant, 561 people were killed and 3,000 injured. Much less severe was the explosion of cyclo-hexane at Flixborough, England, in June 1974; 28 people died. Then in the 1970s a new industrial risk arose, the production of oil from the sea. It had of course been carried out in the offshore regions of the Gulfs of Arabia and of Mexico for some time, but never before in such dangerous waters as the North Sea.

OIL RIGS

By 1981, more than 100 divers and workers on offshore oil rigs in the North Sea had lost their lives, a loss registered by the oil industry as nothing more than a statistic in oil production economics. Only when on 27 March 1980 the Keilland platform sank in the Ekofisk oil field with the loss of 123 men aboard was there a major investigation. It was concluded that serious flaws in both design and construction were responsible. A 70 mm long crack in one of the welds had existed since the rig was manufactured; this led to the development of a fatigue crack in one of the bracing columns which failed in a North Sea storm. A similar disaster overtook the Ocean Ranger off the east coast of Canada in February 1982 with the loss of 84 men during a fierce storm; structural failure was considered the reason for the disaster. These were by no means the only disasters which occurred on oil rigs. In November 1979 an oil rig off China collapsed and 79 men died; others, fortunately with a much smaller loss of life had occurred in January of the same year when a new rig sank while being towed from Scotland to Brazil; in May 1979 another rig collapsed in the Mexican Gulf, off Galveston. Deadly accidents to divers operating from oil rigs and their attending control ships are too numerous to be considered here and unfortunately little research has been undertaken to improve their working conditions.

The safety of oil rigs and their crews became a highly political question, with human lives balanced against the profits of operators and their many sub-contractors. A highly critical book, The Other Price of Britain's Oil was published in 1981 by W. G. Carson of the University of Edinburgh; his main argument was that the Government Agency responsible for production of oil was also responsible for safety, two objectives fundamentally contradictory. Disaster research is powerless when such conflicts are involved.

COMPUTER AIRSAFETY

The situation is even worse for disaster research when relevant facts are deliberately hidden. Such is the case for certain investigations of air crashes demanding disaster research

of a very special nature; this is particularly so nowadays when flight path control is computer predetermined. Two examples might be briefly considered. The Air New Zealand DC-10 which crashed into Mount Erebus, Antarctica, in November 1979, with the total loss of 257 passengers and crew, the third fatal disaster of a DC-10 that year. And secondly the total loss of the Korean airliner, KAL-007 a Boeing 747 in September 1983 with the deaths of 269 passengers and crew, when it was shot down by a Russian fighter. In both cases the position of the aircraft was not the one intended and both had their flight paths computer predetermined. Subsequent official and unofficial enquiries into both disasters left many doubts and it is unlikely that the full facts will ever be known. What research can answer these questions where facts remain secret and when the pilots are dead?

ATOMIC ACCIDENTS

The last type of man-made disasters to be considered is also the worst, the possibility of a malfunction at an atomic reactor leading to the release of very large amounts of radioactivity. Much of the debate about the safety of nuclear power focusses on the large number of fatalities that could be caused by an extremely unlikely, but imaginable, reactor accident. Sir Walter Marshall, FRS, until recently chairman of the UK Atomic Energy Authority, discussed in October 1982 (Atom 312 p.210) the vocabulary used by the media - for example 104,000 killed - compared to the technical description of such an accident. He did not specify what such an accident might involve, for example a melt-down of the core, nor did he mention the direct number of people killed by lethal radiation received in the neighbourhood of the disaster. He did, however, state the increased average probability of cancer for people exposed to 1 rem: a loss of 20 hours in their life expectancy of 70 years. If such a gigantic hypothetical accident should occur in London, with an assumed population of 10 million, it would result in a potential long-term death toll of 1,250 persons. It is doubtful if such figures would assuage public concern, particularly when films like The China Syndrome with their horrific, but not impossible scenario, are given such wide publicity.

WINDSCALE

The first accident to an atomic reactor which received world-wide attention occurred on Friday 11 October 1957, when the graphite moderator in the air-cooled nuclear reactor at Windscale in Cumbria caught fire. It had been built to produce plutonium for British bombs. No-one had ever seen or experienced such a fire or anything like it, and the only solution to the emergency was to put out the fire by drowning the reactor in water. A small quantity of radioactive iodine escaped, and found its way from the surrounding fields, through grass eaten by cows, into milk, which was declared unsafe and was confiscated.

No lasting disaster occurred and no-one was hurt, yet the effect of the accident was widespread, the first ever to be made public. A sister reactor was also shut down for good and the two giant concrete structures with their huge overhanging chimneys stand today, after a quarter of a century, as "monuments to our ignorance" as Lord Hinton described them. The full details of the fire were described 25 years later by Roy Herbert, present at the accident, in New Scientist of 14 October 1982, page 84.

URAL ACCIDENT

Much worse, but not revealed to the west until 20 years after its occurrence, was the accident in the USSR, described in a most interesting piece of disaster research. Dr. Z. Medvedev proved that a large explosion of nuclear waste in the South Ural mountains had occurred in late 1957 or early 1958 (New Scientist 30 June 1977, p. 761). He made a systematic search of the Russian biological literature and found a large number of scientific research reports describing amongst many other facts the behaviour of many different species, from single cell algae to carp, living in highly radioactive contaminated areas. In only one of the papers he found was a location given, obviously a slip in censorship. From the number of generations, up to 30, who had lived in contaminated areas, it was easy to calculate the date of the accident. No loss of human life has ever been revealed.

THREE MILE ISLAND

So far the most serious potential disaster occurred at Three Mile Island. Let me quote the official report:

"On Wednesday, 28 March 1979, 36 seconds after the hour of 4.00 am several water pumps stopped working in the Unit 2 nuclear power plant on Three Mile Island, 10 miles south-east of Harrisburg, Pennsylvania, USA. Thus began the accident at Three Mile Island. In the minutes, hours and days that followed, a series of events - compounded by equipment failures, inappropriate procedures and human errors and ignorance - escalated into the worst crisis yet experienced by the nation's nuclear power industry." (The President's Commission on the Accident at TMI, John G. Kemeny Chairman, published Washington, DC, 31 October 1979.) That such an accident was to occur sooner or later, was brilliantly forecast by Thomas N. Scortia and Frank M. Robinson in their disaster fiction book The Prometheus Crisis, published in 1976; it was made into the film The China Syndrome two years later.

One reads in the Kemeny report "that training did not adequately prepare them (the operators) to cope with the accident at TMI-2" (p. 91) and "the fact that they failed to realize that these conditions resulted from a LOCA (Loss of Coolant Accident) indicates a severe deficiency in their training to identify the symptoms of such an accident" (p.96). Also on page 91:

"Frederick and Faust (two reactor operators) were in the Control Room when the first alarm sounded, followed by a cascade of alarms that numbered 100 within minutes. The operators reacted quickly as trained to counter the turbine trip and reactor scram. Later Faust would recall for the Commission his reaction to the incessant alarms: "I would have liked to have thrown away the alarm panel. It wasn't giving us any useful information".

These must be the interdisciplinary lessons of the Three Mile Island accident:

- * Accidents will inevitably happen at nuclear power stations as anywhere else and they will always be unpredictable.
- * To keep accidents to minor inconveniences, it will be essential to have in the control rooms operators trained to astronaut standards, and to accord to the best of them salaries and status equivalent to captains of a jet aircraft.
- * Only the most modern electronic computer aided instruments and executive controls can find a place in the high technology operation rooms of nuclear power stations.
- * And finally, when the inevitable and unpredictable has happened, as unfortunately it must, a highly efficient aid and rescue service should be available; they will have had frequent rehearsals and thus have become near perfect.

DISASTER REHEARSALS

Apparently once a year, each British nuclear power station holds an emergency exercise. Little of these exercises is made public and the general population is never involved; thus little can be said about the effectiveness of such emergency drills. However, one of these was described in full in The Sunday Times of London on 18 May 1980, but giving little detail of what would have happened in the case of a real disaster. All actions and reactions within the atomic power station, Dungeness, went according to plan: the incident assessment team donned protective gear, the local fire brigade extinguished a fire, and a much delayed damage control team finally cleared the way to an emergency valve which was closed and thus brought the "incident" to a close. The exercise was considered successful by those who had planned it and who had prepared the 50 page document setting it out.

In the Federal Republic of Germany, two weeks earlier, a similar emergency drill had been held near the nuclear power station at Biblis. At least theoretically the population in the neighbourhood was to have been warned 30 minutes after

the incident, but what would have happened if 60,000 people had been told of it and it was not rehearsed. Buses and trucks would have been made available, but what the private motorist would have done and whether he would have followed the emergency evacuation routes was much in dispute. (Hessische/Niedersächsische ALLGEMEINE 5 May 1980). A real evacuation of any modern large city is generally considered impossible, once panic has been created when a disaster has occurred. One may well doubt if soothing announcements over the radio and television from official sources would have any credence; they would only contribute to the general confusion, as the accident at Three Mile Island so clearly demonstrated.

DISASTER RELIEF

A few final words about disaster relief, a subject that should have the highest priority for interdisciplinary research, when the International Disaster Research Laboratory is established. Today, disaster relief is basically similar to what it has always been - a voluntary, highly uncoordinated affair. Disasters are still too often considered as Acts of God and are dealt with as local resources permit. If luck is on their side, victims receive medicines, food and blankets from their own government, if they are unlucky, their deaths are statistics. Foreign aid, although generously given, is probably the worst cost-effective operation ever mounted, and very rarely reaches the victims in time. Only an International Rescue Organisation with its own stockpiles and experts flown to the scene, can here offer a final and appropriate solution. I pleaded for it repeatedly during the last decade, but have been unsuccessful so far.

IDRL

Let me now sum up the need for interdisciplinary disaster research by giving some details of what an International Disaster Research Laboratory might do. The establishment might not prove as difficult as it appears, as during the last decade a considerable number of disaster fiction novels have been published. Apart from frightening people in general, especially in the nuclear field, this disaster literature has also informed the politicians of the Western world of what natural and man-made disasters might lie in store for us. As a concrete example, R. Doyle's Deluge (Arlington, London 1976), the story of the flooding of London, was considered an important factor in speeding up the completion of the barrage which now protects the metropolis. When politicians are frightened, action can be taken swiftly to prevent disasters, or at least minimise the irreducible residue of risk in man's affairs.

Here then are some of the research areas which might engage the attention of an I D R L, not necessarily in this order of priorities:

- * Human behaviour, before, during and after a disaster, including the role of the media, unwelcome visitors and the needs of special groups.
- * Pre-planning, warning systems, meteorological forecasting and apathy of populations.
- * Demographic trends affecting disasters.
- * State of art and science of disaster prediction.
- * In-depth hindsight reviews of natural and man-made disasters, with laboratory staff members sent to site for direct observations.
- * In-depth literature surveys with particular reference to lessons from historical research (Coates Survey and Ambraseys).
- * Constant review of new technology and its possible effects, positive and negative, on disaster situations.
- * Develop a simple disaster scale of magnitude.
- * Disaster communications analysis, especially role of satellites, disposable radios air-dropped, emergency broadcasting facilities.
- * World-wide co-operation with existing accident and terrorist investigation authorities, for example air and sea transportation.
- * Training and education of people in disaster areas, rescue rehearsals and emphasis on First Aid teaching in schools.
- * Investigate possibility of individual household in disaster areas holding emergency food and water supplies as was done in Switzerland.
- * Triage and other medical aspects unique to disaster situations.
- * Psychological and physiological endurance of workers and victims on disaster sites.
- * Evaluation of satellite imagery before, during and after disasters.
- * Relief priorities for various types of disasters, value of vaccination.
- * Development of simple rescue gear, airdrop of inflatable lifebelts, gin poles.

- * Investigate possibility of model experiments of disasters and their prevention, particularly by mathematical models using computers.
- * Theoretical investigation of safety factor concept, comparison of its application in various industries.
- * Co-operation with Insurance Companies, research and support.
- * Best involvement of Armed Services in disaster relief in different countries, especially their Medical Services.
- * Legislative aspects of state of emergency and Natural Disaster Acts in various countries.
- * and above all develop better rehabilitation, physical and mental, for recovery of disaster victims, carried out by themselves.

Some of the above research areas are already being investigated by Australian and other universities and particularly by the Australian Counter Disaster College and co-ordinated by the Australian Natural Disaster Organisation. But are their resources sufficient to extend their pioneering work internationally and in an interdisciplinary manner to all the research programs outlined above?

TRIBUTE TO NOAH

I want to finish by once more going back in history, to the first recorded great disaster, the Great Flood described in Genesis. Noah was in fact the first search and rescue coordinator. He analysed the risk and trained his sons. Ignoring the ridicule of those whose visions were less keen than his, he constructed his rescue vehicle; gathered the family; searched out the animals to perpetuate all kinds; and when the flood came he set sail. While we may lack Noah's direct communication with the Lord, the lessons of the Ark - analysis, equipment and training - are as valid today as they were in Noah's time.

